Integration of Sustainability in Architecture Education: EMU as Case Study

Soheil Ghaderi

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Prof. Dr. Cem Tanova
Acting Director

I certify that this thesis satisfies the requirements as a thesis for the degree of Master of Science in Architecture.

Prof. Dr. Ozgur Dincyurek
Chair, Department of Architecture

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Architecture.

Assist. Prof. Dr. Badiossadat Hassanpour
Supervisor

Examining Committee

1. Asst. Prof. Dr. Badiossadat Hassanpour
2. Assoc. Prof. Dr. Resmiye Alpar Atun
3. Asst. Prof. Dr. Münevver Özersay

ABSTRACT

Sustainability these days is turned to a buzz-word in field of architecture. However, there are little researches on how architecture programs' curricula are accommodating this theme.

This research attempts to provide insight into intentional and productive incorporation and implementation of sustainability issues in the curriculum of any architecture program. Eastern Mediterranean University (EMU) in Cyprus which is an institute aiming for high-quality education; chosen as case study; to determine the level of current integration and implementation of sustainability in its program both at macro (curriculum) and micro (design studio) scales and to boost the strategy in both named scales based on research that has been already carried out. Mixture of qualitative and quantitative method is used in this thesis as a methodology.

Acquired findings reveal that sustainability issues are currently being incorporated in architectural design studios and theoretical courses from second semester of architecture education at EMU in diverse levels. However it could still be developed in some aspects by the suggested recommendations. The Recommendations of this thesis would be supportive lessons for other universities that attempt to improve their architecture education.

Keywords: Architectural Education, Sustainability, Curriculum, Design Studio, Integration

ÖZ

Bu günlerde, sürdürülebilirlik kelimesi mimarlık alanında çok kullanılmaktadır. Ancak mimarlık müfredat programlarının bu terimi bağdaştırması adına yapılan araştırma miktarı çok fazla değildir. Bu araştırma, mimarlık müfredat programlarına odaklı ve üretken birleşme ile sürdürülebilirliğin uygulanması konularında anlayış kazandırmayı hedeflemektedir. Doğu Akdeniz Üniversitesi (DAÜ), Kıbrıs'ta yüksek kalitede eğitimi hedefleyen bir enstitüdür ve alan çalışması olarak seçilmiştir; hem makro (müfredat) hem de mikro (dizayn stüdyosu) ölçekteki mimarlık eğitimindeki mevcut bütünleşmenin ve sürdürülebilirliğin uygulanmasının seviyesini belirlemek ve buna ek olarak, bu iki ölçekteki stratejileri, yapılmış araştırmalara bağlı olarak yükseltmek. Bu tezde nitel ve nicel yöntemlerin birleşimi kullanılmıştır. Bulgular, sürdürülebilirlik konularının DAÜ mimarlık dizayn stüdyoları ve teori dersleri çerçevesinde birinci dönem hariç tüm dönemlerle kapsamlı seviyelerde birleştirildiğini göstermektedir. Fakat bu durum, verilen öneriler doğrultusunda bazı yönleriyle hala geliştirilebilir. Bu tezin önerileri, diğer üniversiteler için de mimarlık eğitimini geliştirmeleri adına yardımcı ders niteliğinde olacaktır.

Anahtar kelimeler: Mimarlık Eğitimi, Sürdürülebilirlik, Müfredat, Dizayn Stüdyosu, Birleşme

TO MY PARENTS

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INTRODUCTION

1.1 Research Background

Design and construction of buildings sometimes causes the demolition of the environment due to many reasons. They have negative impacts on the poles, oceans, atmosphere and etc. The cities around the world face with the dangers such as acid rains, demolition of the ozone layer and earth warming resulted from the utilization a lot of natural sources (Fleming, 2002). Other problem such as low water supply, loss of open space, poor air quality and etc., are pertaining to how buildings are designed (Fleming, 2002). The disastrous and dangerous influences of the unsustainable project, and also utilization from the previous century are actually part of daily experience in human's life (Ramirez M. 2006).

Over the last five decades, a number of scholars and researchers have mentioned concern which the world is defective and damaged because of being far away from sustainable improvement. In this regard, the idea of sustainability has become a very important aim in the international and national discussions (Goodland and Daly, 1996; Doughty and Hammond, 2004). For the first time, sustainability was introduced by the Conference of United Nation in Human Environment (1972) at Stockholm in the worldly dimension (Drexhange and Murphy, 2010). Later, this concept was improved by United Nation Conference on the environment in Rio de Janeiro. Sustainability is described in these conferences as "the improvement that

meets the requirements of the present without compromising the capability of future generations to attain their own needs" This description has three key principles including requirements, improvement, and future generation. According to this concept, a person has a moral duty of sustainability. Generally, sustainability is such an improvement procedure that considers generating, conserving and developing life quality of people in the entire world. Furthermore, more than two decades, the sustainability definition has expanded in the social and economic aspect. In this regard, sustainability is equilibrium between environment, economic and social sustainability. (Berke and Conroy, 2000)

Architecture is a particular activity of human which incorporate artistic formation with technological opinions and scientific knowledge. There is essential need to transfer knowledge to all nations of the world to increase developments in clean procedure and designing of the building.

AIA (The American Institute of Architects) as one professional organization in architecture, has adopted that all new construction and large renovations use carbon-neutral by 2030, decreasing the influences of construction on climate change, concentrating on energy. The AIA changed its continuing education needs to add a necessary four-hour concentrate on sustainable design since the fall of 2008. (Rider, 2010)

Since increased concentrate is put on professional training, appropriate design education should integrate new methods of adapting green design elements, high-performance building methods into the currently overflowing curriculum. As concerns continue to escalate about the environment, a number of professions

considering how their own educational system can be more sustainable. (Rider, 2010)

Thus, the educational community should be integrated with this concern and provide suitable technique and methods for a suitable integration and better comprehension this topic regarding economic, social, and environmental aspects of sustainability.

The prosperity of any society in attaining sustainable development is related to how they balance three sustainability aspects (environment, social, economic). (Goodland, 2003)

This study attempts to provide vision into how sustainability could be strategically and productively incorporated into architecture programs, as well as into potential barriers to this integration. In addition, this study is created to discover the most perceived successful approaches of incorporation sustainability in architecture education into curriculum such as teaching style, conversations created, course type, strategies can be drafted to lead the beneficial incorporation of sustainability topic in the education of architecture. Having this knowledge base will better capable instructors to provide future generations of architects that can create a successful collaboration to the world they live as experts.

1.2 The Importance of this Thesis

The level of involvement and integration sustainability theme in the higher education is gradually growing (Al-Hagla, 2012). Education has vital role in developing sustainability and increasing the capacity of the person to address sustainability and development topic.

The NAAB (National Architectural Accreditation Board) states, architectural programs should present graduates who are capable of responding the architectural design issues, such as the safety, health and the incorporation of technical systems requirements (NAAB, 2012). This growth in the education of architecture created an alteration toward designing sustainable and also, instructing sustainable design to architects. According to the response to this challenge, a number of architectural programs attempted to discover appropriate ways to improve integrating sustainability in architecture education; but, this challenge of alteration is more intentional than operational and it does not take place in such an operationally technique (Banissad, 2001).

This thesis attempts to study sustainable education in both macro (curriculum) and micro (design studio) scale and improve an approach in both named scales based on done analysis. These two scales of study help to offer more comprehensive recommendations. This research's findings and recommendations are significant because based on literature a number of schools around the world are in the same case and this study could open up a discussion of attaining better integration of sustainability theme in schools architectural pedagogy.

1.3 Problem Statement

The integration of sustainability in the education of architecture is a topic of concern and issue in the educational realm; however the literature that dealing the topic is spare and weak. Several architectural programs attempt to recognize the methods to develop sustainability in architecture education. However, this challenge of variation in architectural education is not taking place in an operational way (Banissad, 2001).

In another word, an essential challenge in modern architects is incorporating the principles of sustainability in designs devoid of restricting their usefulness and style.

Although there is a general settlement on the necessity about sustainability in the education of architecture, several questions are not clarified yet. For instance, how the architecture education can be successful in the incorporation of sustainability theme? Or which courses and methods can help the student to achieve knowledge of sustainability in the social economic and environmental aspects?

According to prior explanations, the under review problems in this thesis are;

- Firstly while sustainability is becoming a motto nowadays, however there is no evidence of certain curriculum framework integrating sustainability theme in schools of Architecture in Mediterranean region
- Secondly level of awareness and training on sustainability issue is minimally discussed
- Thirdly how this integration could be increased and which supportive tools-methods are available.

1.4 Objective of Thesis

Design studio and whole architecture curriculum are both major component of architectural education organizes its potential role as a factor for measuring the sustainability consequences in the entire procedure of architectural education.

This research studies both macro and micro scale which are architectural curriculum and design studio. The role of a design studio in architectural education has special potential in integrating sustainability into architectural pedagogy which needs to be addressed in detail. The objectives of this study are explained along these lines:

- To document, study, explore definition of sustainability regarding the three main aspects (environment, economic and social), the principles of incorporating understanding of sustainability in architectural pedagogy.
- To investigate the different variables that can lead to sustainable development in architectural education in general and design studio in particular.
- To access the level of the implementation and incorporation of sustainability issues in the curriculum of Architecture program at EMU.
- To develop certain recommendation for other schools.

1.5 Research Methodology

This study presents broad literature about principles of sustainability in architecture and architecture education. After reviewing the literature, this thesis attempts to study EMU department of Architecture by mixture of qualitative and quantitative methodology in order to find out a lesson from the curriculum, design studios for better future of the EMU department of architecture as well as for the future of the other universities that decide to improve themselves in the region. In this regard, interviews, questionnaire, and document analysis (analyzing the curriculum, direct observation) were used to generate qualitative and quantitative data.

To enhance particularities; department of architecture at Eastern Mediterranean University was chosen as a case study. After an interview with four instructors which lead to recognizing the architecture education and design studio's critical stages about sustainability theme in their responses, the distribution of questionnaire among the students started. A questionnaire survey was carried out within 126 students in six design studios (Arch291, 292, 391, 392, 491, and 492 design studios) of Architecture at Eastern Mediterranean University to study the education location, the

curriculum (Theory courses, elective course, and the design studios), the external aspects (the student's interest and attention about sustainability), the internal aspects (the involvement of sustainability issue in theoretical courses, teaching technique, oral studio discussion) and finally the assessment / evaluation method (the involvement of sustainability in the evaluation of interim submission and final jury) to find out the placement of design studio and architecture curriculum in understanding and integrating sustainability in architectural education. In addition, questionnaire tries to find out the students recommendation about the manners of sustainability theme in the particular course or general architecture education by two other questions. The sample of the questionnaire is from similar previous research about the integration of sustainability however it improved in some aspects (Al-Hagla, 2012). The aim of this sequence (interview, questionnaire) was to recognize the present condition of sustainability in architecture education as a pilot study by the instructors' interviews before distribution of the questionnaire.

In total 4 lecturers and 126 students from six design studios, ARCH(291,292, 391, 392, 491, 492) have responded to their specific interviews and questionnaires at 2015- 2016 academic year. After the interview and questionnaire, analyzing the EMU architecture curriculum started to find out the negative and positive features of sustainability principles in the EMU architecture curriculum as a case study. At last but not least, the author observation attempted to find out the sustainability comments by the jury members in the final submission of six design studios (ARCH 291,292, 391, 392, 491, 492) on the fall semester 2015-2016.

Finally, all findings will be used to provide certain suggestions to be used nationally or internationally for around the world. The methodology would be discussed in detail separately in chapter three.

1.6 Scope of Research

It concentrates on the function of the design studio and architectural curriculum in integrating sustainability theme in architecture education. It improves an approach that incorporates macro (architecture curriculum) and micro (design studio) scale analysis at selected case which is EMU, department of architecture. Eastern Mediterranean University (Faculty of Architecture) as a well-known university in the region, which is under many accreditation procedures and tries to propose up-to-date architectural education has been selected.

The general outline of the thesis is:

1. The case of this research is the Department of architecture at EMU, 2015-2016 Academic semesters. Total numbers of instructors who participate in in-depth interviews were four and numbers of students were 126. Analyzing the architecture curriculum and direct observation within final jury days from six Arch design studios (209, 292, 391, 392, 491, and 492) are other documents. These studies were to just the understanding and expectation of main stakeholders in architectural education.
2. Macro and micro scale were put under scrutiny with the main focus on micro scale which is design studio. Therefore, all done studies on macro scale are kind of support to relevant concerns and issues which can effect focused issue and not beyond that.

1.7 Structure of the Thesis

In chapter one a preface of this study was given by discussing research background on sustainability approach in architectural education, then the importance of this thesis, problem statement, the objective of the thesis, methodology of this research, the scope of research and finally structure of thesis presented.

Chapter two focuses on three relevant keywords such as; Education, Architecture, and Sustainability. The relevant literature attempts to prepare a theoretical framework for sustainability in terms of architecture education by Sustainability and Education, Sustainability and Architecture, Sustainability and Architecture Education, Sustainability and Architecture Accreditation. And also Accompaniment of Architecture Education with Prevailing Themes discussed as well. Following that, chapter three presents details of used methodology, case study and created the form of data collection (Tutors' Interviews, Student Questionnaires, Analyzing the curriculum and Observation). Chapter four illustrates the findings based on instructor's interview, student's questionnaire results, studying and analyzing the curriculum and author's direct observation through the semester by participating in midterm and final jury sections. Then findings would be discussed to identify the strength and weakness points for understanding sustainability in architecture education. Finally, Chapter five would present recommendations for involvement of sustainability in architectural education and the conclusion, important contribution of the study and recommendations for future works. Based on the EMU studies, it is hoped, this study will be a foundation for integrating sustainability theme in architecture education at universities that intend to develop themselves. Figure1 indicates the structure of the thesis.

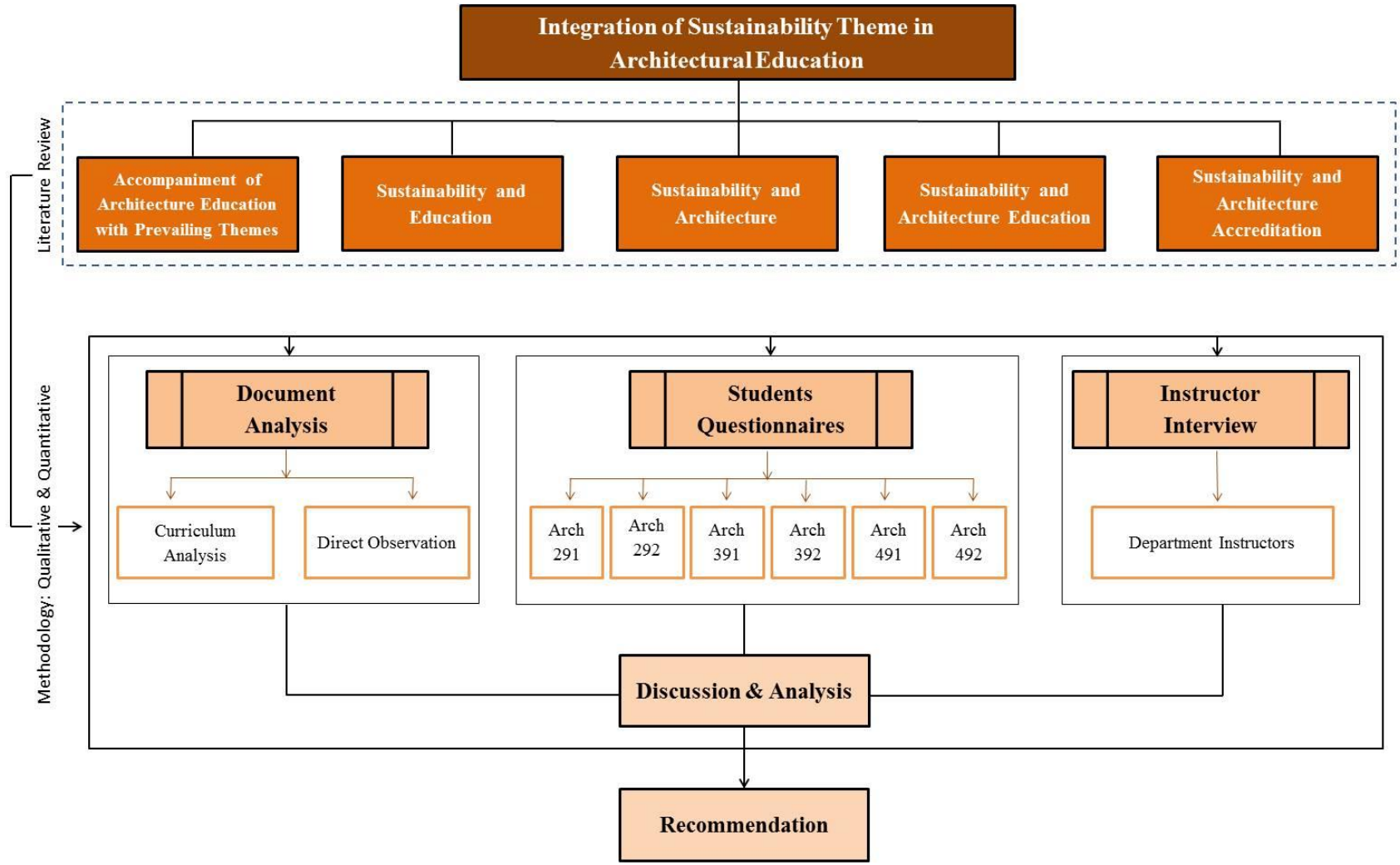


Figure 1: Thesis Structure

Chapter 2

LITERATURE SURVEY

2.1 Introduction

This literature survey attempts to present a theoretical framework about sustainability in terms of architecture education by focusing on education, architecture and sustainability. Firstly, this chapter will present brief background about world's effect on architecture education throughout the history. After this introduction, the definition of sustainability would be introduced with benefit from many references to cover all three aspects of sustainability known as environmental, social, and economical. Sustainability and education as the next focus of literature tried to be clarified by proper background relation of them. Sustainability in architecture investigates the sustainable attributes in the building. Sustainability and architecture education would be the next discussed topic in this chapter and explains about the essential needs of sustainability in architectural education. Later examples of embedded architecture pedagogy with sustainability reviewed. Furthermore, the importance of sustainability in the architectural accreditation systems discussed as well.

2.2 Briefly on Architectural Education

By looking at the education during the history, it is clear that education attempts to adopt itself with prevailing themes by attention to the world's main approaches, theatrical trends and science in each period.

During the Ancient and the Middle Age, the organizations, named as craft guilds or collegia ran by the churches had the teaching role. These organizations were unofficial and voluntary at beginning, but, later they have been taken under municipal surveillance (Gelernter, 1995). The revitalization of city life, activity in economic, a tentative interest in the physical world, and an enhancing faith in individual powers parallel with growing these new craft guilds (Gelernter, 1995). Vitruvius was recognized in the middle ages and it had influences in architecture. He was the first person that wrote about architecture. His book (The Ten Books on Architecture) mention to the user, function (what makes the building usable), beauty, usage of material and etc., as the principles of the architectural design (Rowland, & Howe, 2001).

In the next period, Renaissance needed to change the education system because the Renaissance ideal was the Universal Man. It could not stay in the middle age kind of education, because where the old educational system said how to do a particular task, a new system would need to clarify why it is done that way. In addition, Renaissance attempted to find a same system and structure for all human knowledge. It causes to encourage a generalist training and discouraging the specialist teaching in one field. And also, the Renaissance period distinguished the theoretical scholar from the practical craftsman. (Gelernter, 1995)

In the Baroque period, the academics lost their vigor when the subjective desire overtook the objective one in the attentions of the artists. It means there were many ideas and they thought to reach the ideal level that they do not need any rule and systems. (Gelernter, 1995)

However, they understood that they need to turn the academies to some philosophical aims in the Enlightenment period. In the academy, apprentices obtained the principles and attributes of art or architecture by learning and copying the works of masters under the observation of the professors. (Gelernter, 1995)

The Nineteenth century brought new concepts in theories of education. The child must be permitted to grow from within and continue its own self-motivated direction. The focus was on scientific research rather than on training and examining. Also, the tutors were chosen for their skills to generate new knowledge more than for their abilities at transmitting existing knowledge. Later, the modernists in the twentieth century commenced to speak of architecture as a problem-solving activity. (Gelernter, 1995)

Regarding this, the education attempts to adopt itself with the primary needs, expectation and understanding in each period. In continuation of this adaptation, usage of technology (computer aided software) increasingly emphasized and observed. One of the main concerns in the current century is about to make certain the human actions in present time do not prevent the future generations opportunities (Williamson, et al, 2003). Therefore, it is expected the architects update their knowledge, methods of design construction system, usage of material and use their innovative skills to find new solutions to the current and upcoming hazards and challenges. Of course, educational institutions are the first place that should support the achievement of the aforementioned goals by their pedagogical and curricular modifications.

2.3 Sustainability

As stated in Webster's New World Dictionary, word sustainability is combination of two Latin Words; "sus" that means up and "tenere" that means to hold (Gough & Scott, 2008). However, the definition of sustainability is changeable based on each framework and context in which it is proposed. If there is a claim that "a phenomenon" or "someone" or "something" is sustainable, it shows that the "a phenomena" or "someone" or "something" would be capable of sustaining itself and maintaining till the infinity (Brundtland, 1987).

According to Oktay (2001), sustainability is "a method of ideating about one's connection to the natural world in the context of time" (Yilmaz, 2006). Newman (2002) defined sustainability as a global procedure that attempts to present an enduring future that environmental, social and economic feature are considered (Ngoran, 2015). Wheeler, et al. (2004) stated the term was first used in *limits to Growth* (1972) and after the publication of the "World Commission on Environment and Development's report" (1987), it has been broadly used in the field of architecture, urban planning. Colantonio, et al., (2009) stated sustainability concept was first introduced by incorporating environment movement of the 1960s and respondents to the fundamental requirements 1970s. Transcending the generation is the main characteristic of a sustainable society. A society that is clever, and flexible enough to avoid destruction the economic, social and natural systems that support it. In addition, sustainability has two interdependent fields: socio-cultural on one hand and Economic/environmental on the other. (Benkari, 2013)

The comprehensive definition of sustainable improvement literacy should go through all of its three aspects; the ecological, the economic, and the social (Al-Hagla, 2012). The prosperity of any community in attaining sustainable development is related to how they are able to balance and synchronize these three aspects. The diversity in expounding the concept of sustainability typically depend on how each of the three aims; society, economic and environment are stressed. (Muazu, 2010)

Two diverse models apply for sustainability to clarify the roles and connection of each element. The first model as overlap' model is shown in Figure 2 Based on this model, economy plays as a low ratio for reaching equivalency while the environment has a wide influence to attain sustainable equivalency in a society. According to Mak and Peacok (2011); while the shares among factors are not similar, but all elements end up by each other at a center point.

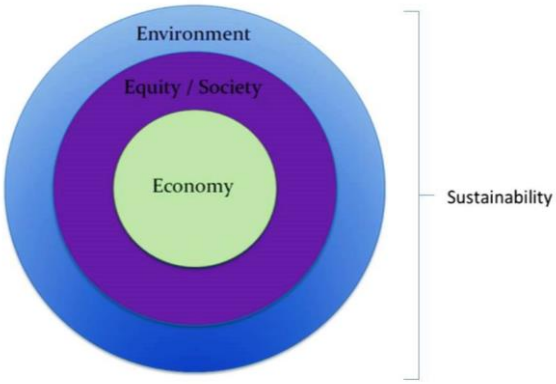


Figure 2: The sustainability in the Concentric Circles Model (Barron & Gauntlett, 2002)

As Figure 3 indicates the second model of sustainability, the circles show the equality in the description and attaining equilibrium of sustainability. There is no distinguished among elements and there are similar interactions so; the action of each circle cannot overshadow of action other circles.

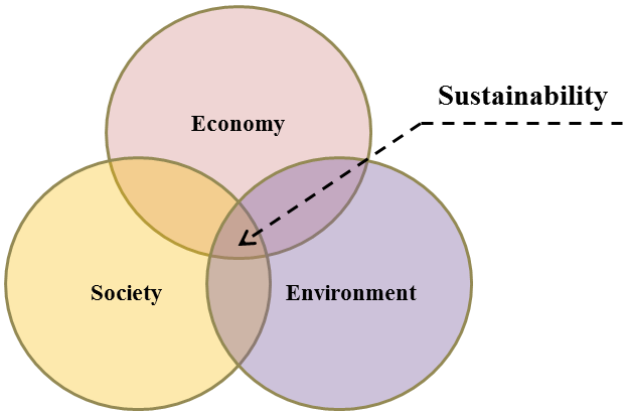


Figure 3: The sustainability in interlocking circle model (Barron, 2002)

Figure 4 shows the components of sustainable development described by Sullivan (2012). It indicates that sustainable development includes three elements as economic, environmental and social. It explains the existence of the mutual areas between, socio-environment, environment economic and socio-economic. It shows the bearable part is the mutual part between socio-environment, and the equitable area, as the mutual area between socio-economic. Moreover, the viable part is the mutual part between environment and economy. Therefore, regarding this explanation, it should meet three main elements bearable, viable and equitable factors as a delegate of mutual zones of social, environment, economic principles for having sustainable development. (Sullivan, 2012)

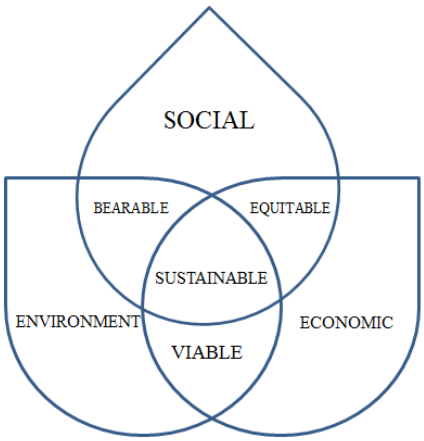


Figure 4: Interaction of Environment, Social and Economic (Sullivan, 2012)

According to Lehtonen (2004), these classifications have either a dependent relationship or independent to clarify about sustainability. He believes each element has its own logic and characteristic. It is possible to overlook economic factor from social and environment view, social from economic or environment view, and the environment from socio-economic view whereby from a free and independent point of view.

As it discussed, all aforementioned definitions are agreed on three aspects of sustainability that are environmental sustainability, social sustainability, and economic sustainability. Each of these aspects needs to be studied more in depth.

2.3.1 Environmental Sustainability

Traditionally, sustainable environment focuses on carbon emission, attaining ecologically sustainable and energy efficiency that eliminate the negative influences of the environment (Nijkamp and Soeteman, 1988). Environmental sustainability prohibits damaging effects on the environment by applying efficiently usage of renewable sources, natural sources and preserving the water, soil, air, and from pollution (Abidin and Pasquire, 2007). According to Sullivan, (2012) increasing the level of population, urbanization, decrease of resources, and alteration of climate are main reasons for finding the solution to attain environmental sustainability. Roufechaei, Abu Bakar and Tabassi (2013) mentioned factors such as efficient usage of energy, renewable energy; conservation and land utilization should take in to consideration in terms of building and creating sustainable environment. To achieve environmental sustainability, other sustainability aspects are needed to be achieved (Goodland, 2003).

2.3.2 Social Sustainability

Lombardi (2001) and Parkin (2000) stated the attaining well-being society objective, human feelings like the safety, satisfaction and comfort and human contributions such as knowledge, motivation, skills are the factors for achieving social sustainability. The fulfillment of basic needs of society is the main objective of social sustainability (Vallance, et al., 2011). According to Roufechaei et al., (2013), creating wellbeing and consultation in a community, providing accessibility for a good education are the roles of social sustainability.

Ghahrmnpouri et al., (2013) state, social sustainability such as dynamic idea with a high probability of alteration over time in a place. Social sustainability can be more understood by describing it as a "life-enhancing condition within communities and a process within communities that can attain that condition" (Davisson & Wilson, 2009). Sachs (1999) is an empiricist which defines social sustainability as democracy and equity in any society. Chiu (2003) point out the aim of social sustainability is to keep and develop of the well-being of present and future generations. But, there are other beliefs which are supporting satisfaction of human basic needs by Littig and Griessler (2005). Davidson (2009) implied social sustainability in its, culture and re-production rather than restricting it to the fulfillment of human needs.

2.3.3 Economical Sustainability

According to Kim and Rigdon (1998), the economical aim of sustainability is decreasing the waste energy, recycling materials and reproducing the new sources. Economic sustainability can enhance beneficial gain by efficiently managing available sources (financial, material and human) (Abidin and Pasquire, 2007). Further, with attention to the built environment, affordability of houses, management

of risk, business empowerment, complying with legislative rules, life cycle cost should be the consideration of building developer (Bennet and James, 1999).

The main challenge to achieve economic sustainability is the request to equilibrium the economic cost with the profits taken from economic processes. Regarding this challenge, it shows that the input cost, extraction and also the processing cost are significant. One sustainable system from the economic aspect should generate services and continuous goods in high and manageable levels (Chiu, 2003). Within this thesis's context, sustainability is considered with all its aspects such as cultural and social component as well as an economic and environmental.

2.4 Sustainability and Education

The subject of the environment comes into education broadly with the support of United Nations in the 1970s. The attainment of awareness about the environment and its problems, the achievement of problem-solving skills, the improvement of attitudes, behaviors and values that respect to the environment, the improvement of abilities to recognize the situation, collective and individual contribution in the implementation of solutions to environmental issues were the aim of environment education. At the beginning, the education of environment introduced the environment as a category of issues and concerns to be solved and prohibited (Orellana & Fauteux, 1998). "These deficits were partially addressed in the field of ecology, which shifted from a problem-solving focus to a systems approach stressing connectivity and relationships between organisms and communities" (Capra, 1996).

Since the Stockholm Declaration of 1972, the incorporation of sustainability in the education has been continually enhancing. Regarding an estimated 42% of 18 to 30-

year-olds in 2007 in the UK was studying in higher education. It is obvious there is a significant role and a great potential which will effect improvement of sustainability literature citizens (Alshuwaikhat, and Abubakar, 2008). In addition, it is known that attention in environmentally orientated institutes, and their graduates are essential to attain the impressive performance of the set of strategies regarding the environment (Giacomelli, Travisi, & Nava, 2003).

'Greening the Curriculum' or 'Greening the University' are the common expressions that attempt to mention to the incorporation of environmental perspective into university operation and teaching system (Alabaster and Blair, 1996). The university provides the decision makers, leaders, entrepreneurs and future leaders. Thus, a university can be helpful for discussing the value of sustainability to a wide diversity of the audience. Therefore, this could be an initiative calls for universities to improve sustainability as a responsibility by creating sustainability a teaching tool and also sending the message that it is vital. This is attained by permeating sustainability into undergraduate and graduate curriculum and courses for majors of the humanities, management, science, and technology built environment and etc. (Alshuwaikhat & Abubakar, 2008)

The agenda 21 at the UN conference on environment- UNECED (Earth Summit, 1992) as the most certified by literature, admitted the rationale for integrating sustainability in education. The 36th chapter of 40 chapters addresses the education for sustainable improvement. Based on this chapter, education for developing sustainability is a serious and important factor in leading the society to a more sustainable future. And while basic education offers the foundation of environmental

education, the subsequent needs to be integrated as a vital part of education. (Blewitt, 2005).

"2005 till 2014 has been declared as a Decade of Education for Sustainable Development by United Nations. The UNESCO "United Nations Educational, Scientific, and Cultural Organization" have taken the steer on this issue" (Dawe, 2011). A significant part of sustainable development in education is how tertiary education integrate into educating sustainably literate graduates (Dawe, 2011).

In the recent years, some of the organizations such as Higher Education Funding Council for England (HEFCE) and University Leaders for a Sustainable Future (ULSF) have worked on focusing three approaches of sustainability (environmental, economic and social development) (Brunton, 2006). According to ULSF:

"Sustainability demonstrates that the critical and serious activities of a higher education institution are (at a minimum) ecologically sounded, economically and socially viable and that they will continue to be for future generations." One sustainable university would focuses on these significances in its research and curriculum, providing students as working citizens to contribute to an environmentally sound just society (ULSF 2005).

This matter has been repeated in the report of HEFCE on 2005:

"In our perspective the greatest contribution higher education has to make to sustainable development is by enabling students to improve new knowledge, skills, and values. The most important way to create this happen is through improvements in pedagogy and curriculum".

The HEPS “Higher Education Partnership for Sustainability” in its published report on 2003 explains literate people in sustainability as those who:

• have adequate skills and knowledge to act and decide in a way that helps to sustainable development

• realize the requirement for change to a sustainable way

• identify and reward other people’s actions and decisions that help sustainable development. (Gough & Scott 2003)

Thus, the value of interest in incorporating an understanding of sustainability into higher education is increasing (Al-Hagla, 2012). Wals and Blewitt (2010) investigated the research published in the IJSHE (International Journal of Sustainability in Higher Education) in the nine years of its existence from the opening (2001 to 2010). Based on their analyses, most articles concentrate on the subjects such as reducing a university's ecological footprint, environmental management, and university greening. It seems there is an increase in number of articles, volumes studying about learning, instruction, pedagogy, partnerships and community outreach (Jorge, 2014). However there is a wide discussion on how education sustainable development is best implemented and conceptualized in higher education (Bonnett 1999; Corcoran and Wals 2004).

Incorporating sustainability into higher education has begun important shifts in educational paradigms. For example, the transformation of the concentrate from predetermined learning outcomes and content toward the nature in the educating experience is one aspect of these shifts. This perspective is essential if person attempts to pay attention and care for social and personal alteration towards sustainability via educating (Sterling, 2004).

The study of sustainability must be grounded in complex adaptive system epistemology because sustainable development concerns both natural systems and human and these systems are co-evolving. (Norgaard, 1994; Dale, 2001 & Dale, 2005)

2.5 Sustainability and Architecture

It is very difficult to express an accurate description of sustainability in architecture (Tascı, 2015). Take less from the earth and offer more to the people is a concept had been discussed with diverse priorities in the different period under various terminologies and titles since the 1970s. For instance, as Figure 5 indicates the terminology "environmental design" was using in the 1970s.

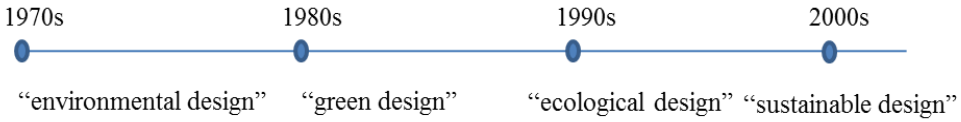


Figure 5: Different Terminologies since the 1970s

Later, the "Green Design" in the 1980s, "Ecological Design" in the late 1980s and in 1990s was using for this concept. And after these terminologies, the concept of "Sustainable Design" has begun to be used since the mid-1990s (Arslan, 2008). To this end, a number of concepts and terms have been increased such as 'Sustainable Design', 'Green Architecture', 'Green Development', 'Designing Regarding the Climate', 'Eco-House', 'Ecological Designing', etc. To attain them, multiple techniques to implement solar power, recycled materials, geothermal energy, nontoxic materials, recuperation and use of rainwater, wind power, and energy efficiency, have been employed (Papadakis, 2012).

The idea of sustainability in architecture is connected to a global action to the destination of sustainability in all aspects of life. Sustainability in architecture is the action of building and construction that aid the presence of humanity without destroying its cultural, social and environmental background. Sustainability in architecture is a new method of understanding and observing the world that offers the cultural and social movement in the world (Mahgoub, 1997). Bromberek (2009) implied that sustainable architecture expectation is bringing the five main elements which are as follow together:

a. Environmental sustainability

b. Financial sustainability

c. Technological sustainability

d. Social sustainability

e. Organizational sustainability

The main aim of sustainable architecture is to create best relations among people and their environments and also discover architectural answers that guarantee the natural environment, built environment and well-being and coexistence of human (Kim & Rigdon, 1998). Sustainable constructions should have the minimum influences on the regional and global environments. Sustainable design can differ from the utilization of harmless interior surfaces and energy efficiency to being made of recycled materials and entirely powered by the sun. Thus, sustainability in architecture can be explained as an approach and method to architectural design that can reduce resource consumption, moderate environmental damages, use of natural energy, and improve human wellbeing (Hancock, 1993).

The main challenge of architecture is decreasing the negative influences of the construction industry in the environment by energy consumption and optimizing the materials usage. Sustainability in architecture is a subject that does not relate to a specific style of architecture. It covers all concern about proper utilization of energy and materials (Williamson, Radford, and Bennetts, 2003).

2.5.1 Sustainability in Buildings

According to Kim and Rigdon (1998), the fundamental principles of designing a sustainable building are:

a. Economic utilization of Resources: **"**is concerned with the reduction, reuse, and recycling of the natural resources that are input to a building."

b. Designing by attention to the Life Cycle: it provides a method for investigating the process of building and its effect on the environment. The building life cycle in the formal model as a straight process has five main phases which are as follow; "design, construction, operation, maintenance, and demolition**."**

c. Humanistic Design: concentrate on the interactions between the natural world and humans. One of the most significant principles of designing a sustainable building is Humanistic Design.

Williamson, et al, (2003) indicated the need for sustainable architecture is to make certain the human decisions and actions in present time do not prevent of the future generations opportunities. Therefore, the construction of the building and its relation to the topography, the positioning and orientation are important factors regarding the sustainable architecture. This method should be applied correctly in all the procedures from material supply to treatment, from the foundation to the

construction procedure, and from the utilization of material to disposal management. Ensuring energy efficiency in the building, recycling, reducing material waste, sparing of water, minimalizing the preservation costs by pre-planning are some important subjects for designing a sustainable building (Tascı, 2015). Moreover, the design of windows, reduce the impact on eco-systems, good landscaping, shading devices and louvers, enhance indoor environmental quality by using the maximum natural light to decrease costs, protect water, airing systems and control moisture are other characteristics of sustainable building (Yarmohammadi, 2013).

Among the cases that should paid attention in order to create a building suitable and compatible with the environment are designing with the purpose of protecting human health, managing energy in the building by utilization of managing systems, designing by attention to climate, using the local constructional techniques, designing a building resistant to natural damages and dangers. The combination of living and work spaces, designing for fulfilling the function are other characteristics of one sustainable building that would help to increase the quality of life. Attention to aesthetic elements that is appropriate with local architectural forms, in harmony with nature, identity and culture are other features of one sustainable building (Tajfar, 2006).

Another factor of sustainable building is flexible designing. Applying readymade components and attention for designing buildings with possibilities to alteration of utilization in the future are characteristics of one flexible building. One sustainable building steers to reduce of mental stresses and would have positive values on people's comfort, health and the enhancement of efficiency (Tajfar, 2006). Kim and

Rijdan (1998) classified the sustainability attributes in the building by considering ecological, environmental and social aspects which are as follow:

A. Ecological Principles

- Maximum usage of renewable resources in the buildings and replacement of renewable energy sources with un-renewable ones.
- Designing according to climate.
- Attention to orientation of the building based on harmony with nature and solar geometry.
- Using vocal, humidity, and thermal isolation.
- Utilization of passive and active energies
- Utilization of appropriate wind in the area for ventilation in hot seasons.
- Utilization of solar panels for producing warm water.
- Utilization of local materials for reducing the energy required for carrying the materials.
- Utilization of photovoltaic cells in order to produce electricity.
- Prohibiting rainwater waste.
- Utilization of renewable and recyclable, healthy, local materials in building.
- Attention to the details particularly the connections of the floor for decreasing energy consumption.
- Using internal partitions for making small and private spaces.

B. Environmental Principles

- Utilization of the private gardens, natural habitats, and progressive plant leaves in incorporation with the building.
- Prohibiting the pollution of surface water.
- Utilization of recyclable materials in the way of waste water.

- Designing without the environmental damage and with the appropriate view and perspective to the surrounding environment.

C. Social Principles

- Making acoustics
- Dividing private spaces from public spaces
- Creating the buildings with half public for improving the social interaction
- Estimate and observe the ideological and cultural needs of residents
- Using open spaces (parks, streets and squares) in order to create social interactions
- Security

As it can be understood, the attributes of a sustainable building are not just physical factors but covers a wide scope of ecological, economic, social and aesthetic considerations. Harmony between the building and the natural landscape, diversity instead of sameness, reducing chemical materials, decreasing current costs and energy consumption are some examples for creating a sustainable building. As it shown in the Table 1, there is a series of attributes for having a sustainable building collected from various references (Tajfar, 2006; Kim and Rijdan 1998; Yarmohammadi, 2013; Williamson et al, 2003; and Hancock, 1993).

Table 1: The Main Principles of Sustainable Architectural Design (Author)

Principles	Description
Integration with nature	Conservation of natural conditions and optimize the site potentials Minimizing the influences of the building on the environment and eco-systems (attention to the current plants and topography) Designing with attention to climate Attention to orientation of the building based on harmony with nature and solar geometry.

	Utilization of the private gardens, progressive plant leaves, good landscaping, private gardens
Correct use of material	Healthy materials in building Utilization of local materials in order to decrease the energy required for transportation Utilization of the local constructional methods Decreasing chemical materials Designing a building resistant to natural damages and dangers (using resisting materials) recycling materials
Minimum waste	Decreasing the building wastes
Flexible designing	Designing buildings with regard to alteration of utilization Utilization of readymade elements
Attention to Culture and Identity	Aesthetic features with regard to other architectural forms in the area Harmony with nature
Providing security and health	Design should have positive influences on people's comfort and health Psychological health; designing by attention to decrease the mental stresses
Attention to correct design of windows	Utilization of natural light to decrease costs of preparing artificial lighting systems Control circulation systems and moisture (ventilation) shading devices and louvers
Protect and conserve water	prohibiting rain water waste and water recovery (utilization of recyclable materials in the way of waste water)
Human comfort	The sustainable design should not defect on human comfort.
Less energy consumption and decreasing current costs	Attention to the details particularly the connections of the floor for decreasing energy consumption
Management	Finding easy production techniques and providential solutions Minimalizing the maintenance costs by preplanning Managing energy in the building by utilization of managing systems
Dividing private and public spaces.	Utilization of open spaces such as squares, streets and parks for creating social interactions Creating the building with half public for improving the social interaction Utilization of internal partitions for making small and private spaces
Utilization of natural energies, passive and active use of sun	Utilization of solar panels to produce warm water and utilization of photovoltaic cells to

	produce electricity
Improving the quality of life	Combining living and work function is proper zoning proximity
Isolation	Using vocal, humidity, and thermal isolation
Decreasing the destructive influences of construction	Investigating and managing the bad effects from the constructing the building before construction

2.6 Sustainability and Architectural Education

The education of architecture has two main goals that are: "to grow the man of future, and to grow the architect of future" (Yüksek, 2013).

Regarding these two main goals, the matter of sustainability should not be as a matter that is obligatory to be handled in the syllabus, but it should be adopted as a philosophy of life. (Yüksek, 2013)

To meet the requirements posed by the existing problem, sustainability should be observed as a priority from the beginning of education in architecture. Because of this, all institutions should adopt this priority by completely inspiring and motivating the students about the essentials of sustainable improvement in using appropriate pedagogical techniques, methods, tools and sufficient research, finance, human, and time source (Altomonte, 2011). In building environment education, the issue of sustainability with its environmental, economic, and sociocultural aspects is a fundamental priority while talks about the adversities people confront (Yüksek, 2013).

According to this opportunity, new generation of architecture faculties and schools can be widened where nature-oriented architectural education used to meet contemporary instructing environment paradigms aims (Mahdavinejad & Abedi,

2011). Nature paradigm presents a greener environment and more successful educational systems that may help to form a kind of social – behavioral method toward learning procedure and management of education. Creation of nature-oriented contemporary architectural schools is in need of educating environment paradigms. As the main focus of architecture education is the design studio, the curriculum needs efficient design process in the design studio, because it cares about many things such as sustainability. “The results imply that more efficient architectural design process can be achieved through a greener programming for contemporary architecture and design of contemporary architectural schools” (Mahdavinejad, 2014). Actually, the environmental issues must be of special interest of the architects. The capability of the architect to create or design sustainable building is closely dealt with obtaining skill, knowledge, and abilities about this subject during the education procedure. (Yüksek, 2013). In the other words, the implementation and understanding of sustainability in the curriculum must be an objective of architecture education in the entire world (Benkari, 2012).

While the place and the necessity of sustainability in architecture are under debate, the demand that the building takes the first place in sustainability needs more focus yet (Cebeci, 2005). Despite the clear requirement for more sustainable design education in the schools, many architecture faculties do not attention enough about the concerns or cannot detect ways to incorporate a new pedagogical emphasis into the traditional design studio settings (Fleming, 2002). The faculties that attempt to address the topic of sustainability are struggling to discover techniques of teaching topics such as energy efficiency, ecological design, and site integration in a helpful way (Fleming, 2002). By observing generally at the common frame in the world, it can be understood that though there has been a substantial development in the topics

about the electronic media and computer in architectural departments, it might not be said that there have been sufficient developments about design regarding to social environment and ecological sensitivity (Oktay, 2011). Ecological design is typically given as multidisciplinary and all-inclusive programs in investigating the architecture curriculum of the universities in the world. (Yüksek, 2013)

2.6.1 Example of Embedded Architecture Pedagogy with Sustainability

Embedding and integrating sustainability in architecture education has caused a fresh sample of thinking and understanding about the method in which designers, architects attain the design of the built environment (Al-Hagla, 2012). Nowadays, the students that have graduated from department of architecture and schools need multidisciplinary skills, knowledge and abilities to unique projects with detailed technical and theoretical support (Yüksek, 2013). The Esmail Baniassad (2001) as the chair of the department of architecture at Chinese University of Hong Kong believes "The challenge of sustainable design education lies not in our recognition of the need for a change in our values. It lies in how to take it beyond a mere change in our verbal vocabularies. The challenge is to go beyond intentional to operational." For answering to these challenges, a number of architecture programs attempted to find solutions for a mutual goal in establishing a situation in the design studio pedagogy to integrate interdisciplinary learning and teaching as the main feature in attaining future sustainability (Fleming, 2002). Although, the challenge still exists as how to incorporate sustainability into architectural pedagogy (Al-Hagla, 2012). The discussion is placed beyond this assumption that sustainable design is far more intricate procedure that needs a horizontal multidisciplinary intervention (Fleming, 2002). According to Douvlou (2006), one appropriate method for teaching sustainable design is the problem-based learning. Also, based on the opinion of

Boyer and Mitgagng (1996) , the sustainable architecture recommends a curriculum in teamwork and collaboration with other architects and other disciplines (Al-Hagla, 2012). Architecture program in Philadelphia University at Philadelphia in the USA, can be one example of working with other disciplines (Fleming 2002). It was based on one Survivor game show (one TV game show called Survivor) in a multi-faceted assessment. Students rival in small teams with a number of presentations and design projects. Staffs of other faculties are brought for preparing students with more feedback on their design project in the days that assessment take place. In this regard, students realize that the beauty is not just the main factor. It needs to be disability friendly, energy efficient, practical and etc. Thus, students engaged more with the tasks because learning in the game show format causes to deeper learning and the fun activity. (Brunton, 2006)

In this regard, attaining an appropriate degree of sustainable design comes via educating students how to work with other across the disciplines and together. “Educating Architects for Sustainable Future” at Ball State University, Indiana in the United States, is another example of integrating sustainability into the design studios and curriculum. These methods consist creating several voices in studio education, changing the architect as one team player, hero model and developing interdisciplinary method between ecologists, sociologists, designers, etc. (Boyer, 1996)

To develop the understanding of sustainable method in environmental design, beyond the technical matters dealt with carbon emission and energy consumption, the values of resource management, equality between generations, cultural and biological diversity are essential to be adopted in an ethically, economically and

socially applicable design process. These kinds of principles must penetrate into each aspect of architecture such as the management stages of a construction, building, and the idea. Therefore, the graduates of architecture have the abilities to respond the market expectations by integrating the environmental sustainability as a necessary condition in the syllabus of higher education. (Altomonte, 2011)

By researching, applying, and increasing the new pedagogical approaches and skills that will catch up with the distance between architectural design and sustainability sciences, the plan of architecture education should be reorganized in ways to respond to the existing problems(Altomonte, 2011).

Another factor that can help to integrating sustainability in architecture education is active education. Sometimes the common procedure of education is more passive than active (Ellis & Weekes, 2008). The basic goal of an active education is to provide students the capability to use the new knowledge in real life. It can encourage students to grapple with various ways of looking at problems, think creativity and help deeper with issues that are complicated and multi-faceted and also this can happen in experiential and classroom setting.

According to the Bloom (1956), there are six attributes for active education that lead to a noticeable change in feeling, thinking, and actions of students. The attributes are; “knowledge, comprehension, application, analysis, synthesis and evaluation” (Fien, 2002). Knowledge identifies and refers to a category of situations and behaviors that focus remembering subjects, thoughts, and events such as recognition and recalling. Knowledge can be categorized in a variety of accurate and reasonable information to general and abstract information (Fien, 2002). The application cause that one to face

a new problem, use suitable topics and he or she does not need to be told what a proper topic is or how it can be used. The analysis concentrates on the separating the constituent factors of a topic and finding an internal organization and the interactions between its components. Synthesis focuses on the methods of incorporating factors to produce a new pattern that illustrates a creative behavior. Evaluation is not necessarily a representative of the final procedure of cognitive behavior. Sometimes the evaluation is an introduction to commence the recognition procedure because it has the character of a communication bridge between emotional behaviors and cognitive behaviors. Educating is at its maximum level when a person is educated in a manner that learns the method of facing the issue; instead of using common instructions in diverse situations, the person learns to comprehend the values and principals, the suitable attitude toward self-ability and skill and the proper attitude towards the problems. (Mahdavinejad, 2014)

Garden school can be one example of an active education. Gardens turn typical educational places into an appropriate environment for active learning that performances as a bridge to create the connection between the school and society. Garden school permits students to evaluate and consider their theoretical teaching, learn to care about nature and achieve the necessary skill for social correlations and also earning artistically and scientifically. Furthermore, this environment prepares the situation for individual's relationship with the school and enhances moral values. In this regard, students will enhance the level of adapting their need. (Mahdavinejad, 2014)

Based on the UNESCO in the "Educating for a Sustainable Future" program, an appropriate environment education program needs improving principles and values

about the subject more than a passive transfer of knowledge (UNESCO, 1997).In this regard, architecture is entirely instructive by reference to the relation of natural environment to build environment (Tascı, 2015).

All in all, integration of sustainability in higher education is still definitely far from being incorporated into an organic and holistic way by university leaders (Lee, 2013; Milutinovic, 2014). "The slow rate of change at universities shows a great challenge to higher education universities and society to become more sustainable" (Jorge, 2014).

2.7 Architecture Education and Accreditation

Accreditation is a stamp of acceptance witnessing the grade and the quality of an educational program that is accredited on what level it fulfills the predetermined criteria. The two fundamental goals of accreditation are to aid architecture schools, departments and programs in having standard quality values, and also to encourage the development and continuous improvement. Accreditation can be an awareness procedure in one education program to another education program about its successes and activities. The aim of accreditation is demonstrating the transparency of the program, its conformity to the standards of education and better quality from the academic perspective. (RIBA, 2002; NAAB, 2012)

The accreditations in the education of architecture are needed to be followed to ensure the availability of the standard and appropriate program. Obviously, the conditions in each accreditation method should prepare flexibility of process for culture and traditional choices, and etc (Altomonte, 2009). Based on James Write (2003), the accreditations in architecture education may have reached the level of

realizing sustainability is a main subject of architecture. To show this realization, sustainability should be incorporated into the curriculum of architecture (Write, 2003).

The most popular architectural accreditation are National Architectural Accrediting Board (NAAB), Royal Institute of British Architects (RIBA) and for the thesis case, National Accreditation Board of Turkey, Mimarlık Akreditasyon Kurulu (MIAK) will be studied for finding one comprehensive view. The MIAK has been chosen because the case study is related to Turkey and the architectural programs in Turkey should have the MIAK accreditation in this condition.

2.7.1 NAAB Accreditation

The accreditation in architectural education is a procedure that began since nineteen century. Association of Collegiate Schools of Architecture (ACSA) as a first initiative specifies the international standards in architectural education in the United State of America in 1912. However, ACSA closed in 1932 and caused an 8-year gap in the standardization of architectural education system in the US. This break finished when National Council of Architectural Registration Boards (NCARB), Association of Collegiate Schools of Architecture (ASCA) and American Institute of Architects (AIA) together established and created National Architectural Accrediting Board (NAAB) and enabled it to accredit the architecture schools at the national level (Tatar & Yamaçlı, 2013). The objective of the institution in the founding conditions of NAAB in1940 was announced as follows:

- "Establish a system that is integrated into architectural education
- Allows to educational institutions to develop according to their own specific needs

- To produce graduates who are able to solve architectural design problems, including the integration of technical systems and health and safety requirements
- Comprehend architects' roles and responsibilities in society" (NAAB, 1998).

Totally, there are 153 NAAB accredited programs presented by 123 universities. NAAB organization investigates architecture programs outside the united states occasionally by specifying if these universities are "substantially equivalent" to NAAB-accredited programs. The "Substantially Equivalent" Institutions can be exemplified by Kuwait University at Kuwait, Istanbul Technical University at Turkey, King Saud University at Saudi Arabia, and University of Bahrain at Bahrain. Eastern Mediterranean University at Cyprus as one of these universities which achieved the NAAB accreditation recently, was chosen as a case study for this thesis. The architecture programs that attempt to attain the accreditation should accomplish some steps stipulated by NAAB (NAAB, 2012). These steps include a combination of various tasks:

Self-study: programs create a written overview of performance based on the NAAB method for accreditation.

- Peer review: site visit and accreditation review are led by a team of instructors, regulators, practitioners, and students. "These colleagues review the self-study and serve on the visiting team that reviews the program after the self-study is complete. All team members are volunteers and are not compensated" (NAAB, 2012).
- Visiting team report (VTR): the visiting team provides the report of visit at the end of the site visit. "The report contains advancement since the pervious site visit, conditions met, conditions not met and causes of concern. The team

recommends a term of accreditation to the NAAB board. The team's recommendation remains confidential" (NAAB, 2012).

- Judgment by the NAAB Board: according to the VTR, the director of NAAB might specify a term of accreditation for new architecture programs, reaffirm accreditation for ongoing programs, or refuse accreditation to a program.
- "Ongoing external review: the program of architecture pursues to be reviewed over time on cycles that range from every few years to eight years" (NAAB, 2012).

2.7.1.1 NAAB Approach and Sustainability

In 1987, the NAAB institute with four other institutions, the American Institute of Architecture Students (AIAS), National Council of Architectural Registration Boards (NCARB), American Institute of Architects (AIA) and Association of Collegiate Schools of Architecture (ACSA) in the United State of America approached the base of the improvement in educating to present an independent study of occupational education. This study commenced in 1993 and was published in the year of 1996 by a particular report; known as "Building Community". The five institutions and their members supported this report broadly. There are some important suggestion and recommendation about sustainability. The most crucial of them is architecture educators and architects have a guidance role in protecting the planet's sources and the environment. (Boyer & Mitgang, 1996)

In addition, the significance of sustainability can be seen by NAAB mission. NAAB has 13 conditions for the process of accreditation. Some of them are related to sustainable matters of architecture which are quoted here. Regarding the aim of accreditation, graduating students should show ability or comprehension in the following parts:

- B3: Sustainable Design

  Knowledge of the principles and concepts of sustainability in creating urban design and architecture intentions that create healthful buildings and communities and also preserve built sources and nature, including culturally important sites and buildings.

- B6: Comprehensive Design

  Capability to create architectural project based on a site and building program which includes development of programmed areas, demonstrating the knowledge of environmental systems and structural, life-safety provisions, building envelope systems, wall sections and building assemblies and the values of sustainability.

- B8: Environmental Systems

  The knowledge of the concepts and principles of environmental systems' design, for example, embodied energy, indoor air quality, active and passive heating and cooling, solar orientation, acoustics, artificial illumination, and daylighting, include the utilization of appropriate performance assessment tools.

- B12: Building Materials and Assemblies

  The knowledge of the fundamental principles, concepts and proper performance and application of construction materials, components, products, and assemblies, including their reuse and environmental impact. (NAAB, 2012)

Regarding this comprehensive research, each one of these five organizations (NAAB, NCARB, ACSA, AIA, and AIAS) has in differing levels embraced this goal. It can recognize that the architectural community has reached the fact of knowing that sustainable design is a crucial issue of architectural education.

2.7.2 RIBA Accreditation

Royal Institute of British Architects (RIBA) is the responsible organization of accreditation in architectural education in the United Kingdom which was established in 1834. Firstly, it was named “Institute of British Architects” but later awarded its royal charter and gained the name of “Royal” in 1837. At first, the work of RIBA was formulating guidelines on fees and other administrative and practical issues, however, its functional area widened with the formation of committees and the publications created on diverse subjects. The first committee established was “Architectural Education Board” in 1904. The education was one of the main concerns of RIBA that recommends that encouraging people from various backgrounds to be enthusiastic about the field of architecture for improving the built environment and a better future (Tatar & Yamaçlı, 2013). Similar the NAAB organization in the America, RIBA evaluate the education of architecture and research at the universities in the UK and overseas; thus, RIBA tries to create sustain or develop the existing high standard in England (RIBA 2013). The objective of RIBA (Royal Institute of British Architects) is “advanced architecture by demonstrating benefits to society and promoting excellence in the profession” (Altomonte, 2009).

2.7.2.1 RIBA Approach and Sustainability

The RIBA (Royal Institute of British Architects) has started “criteria for validation” that determined the requirements to improve fundamental sustainability skill and knowledge as soon as its part 1 curriculum. A number of architectural schools in the United Kingdom are already working on obtaining this. Several of these schools even intend to go beyond the idea of simply ‘creating students informed’. They decide to present more complex sustainability theme at the beginning of the undergraduate

level such as sustainability factors and other tools as a ‘measuring process’ in the design stages (Shari & Jaafar, 2012).

One of the main goals in the RIBA mission is to motivate requirement for architecture that offers environmental economic and social principles and values to develop as a hub of knowledge on sustainability. In addition, RIBA is working with the government seriously for creating a new policy regarding sustainability development in architecture. (RIBA 2010)

Royal Institute of British Architects (RIBA) is publishing the RIBA Plan of Work since 1963. But the first plan of work in the detailed version was published in 1964. It started originally as a fold out sheet that showed the role of members in construction and design in an easy matrix format. The last version of RIBA plan work is endorsed by the Construction Industry Council, the Chartered Institute of Architectural Technologists, the Royal Society of Architects in Wales and the Royal Society of Ulster Architects and the Royal Incorporation of Architects in Scotland (RIBA 2007).

The RIBA Plan of Work 2013 includes the procedure of designing, creating, preserving, operating and utilization of building in several key stages. It shows the details of necessary tasks at each stage that may overlap or alter to particular project needs. The criteria of RIBA plan of work 2013 are as follows:

“Integrates sustainable design processes, acts across the full range of sectors and project sizes, offers straightforward mapping for all forms of procurement, offers

flexibility in respect to (town) planning processes , (BIM) Building Information Modeling procedures" (RIBA plan of work 2013).

The sustainability in the eight stages of the RIBA Plan of Work 2013 is shown in Table 2.

Table 2: Sustainability in the eight stages of the RIBA Plan of Work 2013

	Strategic Definition	Preparation And Brief,	Concept Design	Developed Design	Technical Design	Construction	Handover and Close Out	In Use
Core Objectives								
Procurement								
Programme								
(Town) Planning								
Suggested Key Support Tasks			*	*	*	*		
Sustainability Checkpoints	*	*	*	*	*	*	*	*

As it shown in the Table 2.2, the sustainability is reviewing on all the way in the sustainability checkpoint, but in general, this part studies each of them separately as follows.

a. Strategic definition in sustainability checkpoint:

In this part, RIBA reminds the architect to ensure the review of client needs (RIBA plan of work 2013).

b. Preparation and brief in sustainability checkpoint

In this part, RIBA reminds the architect some criteria such as,

• Indicating the environmental needs and future climate factors in the Initial Project Brief.

• Stating the formal sustainability goals in the Initial Project Brief.

• Have surveys, consultations or monitoring regarding sustainability criteria

• Applying the Site Waste Management (RIBA plan of work 2013).

c. Concept design in sustainability checkpoint

In this part, RIBA attempts to remind some criteria such as,

• Undertaking the formal sustainability and identification of key parts of the design

• Considering the environmental impact of Construction and materials

• Considering the future change in climate (RIBA plan of work 2013).

d. Developed design in sustainability checkpoint:

In this part, RIBA reminds the architect some criteria such as,

• Investigating full formal sustainability assessment

• Investigating the opportunities to reduce waste and resource use (RIBA plan of work 2013).

e. Technical Design in sustainability checkpoint:

Some examples of Technical Design in sustainability checkpoint are as follow:

• Attention to formal sustainability assessment,

• Attention to outstanding design stage sustainability assessment data

• Specifying monitoring technologies and Handover Strategy (RIBA plan of work 2013).

And also, the sustainability checkpoint is in the Construction, Handover, and Close Out and In Use. In addition, it can be seen in the other levels such as the suggested key supported tasks in the design concept, developed design, technical design, and construction. RIBA plan of work as the most in real life method of design control and management is already considering the theme of sustainability at a huge extent in

the way that almost most of the stages are meeting sustainability. Therefore, it would be naive to deny the importance of having sustainability in architectural education and in a design studio in macro and micro level which are architectural education and design studio.

MIAK (Mimarlık Akreditasyon Kurulu/Architectural Accreditation Board) is the responsible organization for the accreditation of education in the architecture program at Turkey. Evaluating the architectural education in Turkey and developing it via studies and concentrating on institutional qualification are the main goals of MIAK. Therefore, the ultimate aim is the progress of social welfare via educating appropriate architects and well-educated for the future. (Tatar, 2013)

All in all, accreditation organizations attempt to connect the gap among the education of architecture and practice of architecture (Wright, 2003). Each of these institutions set their method, process, and standards for accreditation. Because of similar accreditation purposes, the principles put by each institution do not vary much (Ibrahim, 2008). However, the three professional body accreditation rules vary in relation to the prescribed amount of sustainability in the criteria.

2.8 Summary of the Chapter

This chapter attempted to present the architecture education regarding the involvement of sustainability theme. First of all, the accompaniment of architecture education with prevailing themes of the age has been discussed. The aim was to present short background about world's effect on architecture education throughout the history and finding out the current view of architectural education. Then, the next part tried to explain the definition of sustainability and its aspects such as

environmental, social, and economical. Sustainability and education focused on a background of the relation between education and sustainability. Then, the principles of a sustainable building gathered together for understanding sustainability in architecture. After that, the sustainability and architecture education discussed the involvement of sustainability theme in architecture education. And it presented some example for embedding sustainability with architecture pedagogy. Last but not least, the accreditation in architecture education explained the placement of sustainability in the architecture accreditation. The next chapter will explain the methodology of the thesis.

Chapter 3

METHODOLOGY AND PROCEDURES

3.1. Introduction

This chapter explains the methodology structure of this thesis by reviewing qualitative and quantitative research. The thesis methodology is based on achieving the essential documents about the previous studies and related established theoretical of sustainability in architecture education by literature review. Initially, the chapter will begin with the Exploratory Sequential Mixed Methods Design methodology for describing this method. Next, it explains about Eastern Mediterranean University (EMU) as case study, and its physical context. Then the process of data collection; tutors' interview from four instructors, student questionnaires among 126 students from six design studios, analyzing implemented architecture curriculum at EMU and direct observation from the final juries describes the process of taken actions.

3.2 Exploratory Sequential Mixed Methods Design

In 2003, "the Handbook of Mixed Methods in the Social and Behavior Sciences" (Tashakkori & Teddlie, 2003) was published, preparing a wide and comprehensive overview of Mixed methods research. Exploratory sequential mixed methods design was chosen for this study as the methodology. (Creswell, 2013)

An exploratory sequential mixed method is a process that the researcher first commences by discovering with qualitative data and then uses the results in a second quantitative phase. The next data source creates on the results of the first data source

(qualitative data). The purpose of this sequence is to make better measurement with particular samples of populations and also to see if data from a few individuals (in qualitative phase) can be generalized to a large sample of a population (in quantitative phase). For example, the researcher would first collect focus group data, analyze the results, develop an instrument based on the results, and then administer it to a sample of a population. The researcher employs a three-phase procedure with the first phase as exploratory, the second as instrument development, and the third as administering the instrument to a sample of a population. (Creswell, 2013)

In this strategy, the data collection would happen in two stages with the initial qualitative data collection followed by the second quantitative data collection. The qualitative data analysis can be used to develop an instrument with good psychometric properties (reliability, validity). The development of an instrument can proceed by using the quotes to write items for an instrument, the codes to build up variables that group the items, and themes that group the codes into scales. This is a useful process for moving from the qualitative data analysis to scale development. Scale development also needs to follow good processes for instrument design, and the steps for this including such ideas as item discrimination, construct validity, and reliability estimates. Developing a good psychometric instrument that fits the sample and population under study is not the only use of this design. A researcher can analyze the qualitative data to develop new variables, to identify the types of scales that might exist in current instruments or to form categories of information that will be explored further in a quantitative phase. The qualitative sample is typically much smaller than a quantitative sample needed to generalize from a sample to a population. Sometimes mixed methods researchers will use entirely different samples for the qualitative and quantitative components of the study. (Creswell, 2013)

In this approach the researcher analyzes both databases individually and uses the results from the initial exploratory database to create into quantitative measures. Researchers interpret the mixed methods results in a discussion section of a study. It does not make sense to compare the two databases, because they are normally drawn from diverse samples and the purpose of the strategy is to specify if the qualitative themes can be generalized to a larger sample. (Creswell, 2013)

Researchers using this plan need to check for the validity of the qualitative data and also the validity of the quantitative results. The sample in the qualitative phase should not be included in the quantitative phase as this will present duplication of answers. It is advisable to have the qualitative participants provide information for scale, instrument, or variable design but not to also be the individuals completing the follow-up instruments. (Creswell, 2013)

3.3 Case Study

The Eastern Mediterranean University (EMU) as one of the public-private universities in North Cyprus, Famagusta was established in 1979. At the beginning, this university was as a higher-education institution of technology for Turkish Cypriots with the name of Institute of Technology. Three fields of engineering as Mechanical engineering, electrical engineering, and civil engineering were added to the university in 1984. In 1986, the Turkish Republic of Northern Cyprus and the governments of Turkish Republic decided on changing that to a university called "Eastern Mediterranean University" with the purpose of transforming the institute of higher technology into a state university.

Department of Architecture at EMU University as one of the largest departments was established for students with different design backgrounds and cultural by the purpose of enhancing students' critical thinking, creativity and innovation skill in 1990. Students from more than 49 countries such as Iran, Nigeria, Iraq, and Syria are attracted to train and educate at Eastern Mediterranean University. The "Design Studio" with the "Project-based" education model and "Open-ended Problems" in the projects is the common system of learning and teaching architectural design instructions in the north Cyprus and turkey. The department of architecture at EMU in North Cyprus has been chosen as a case study for the research.

3.3.1 Tutors' Interviews

To comprehend department common idea about the level of integrity of sustainability in architecture education, an in-depth interview has been done in the spring semester of 2015 (Appendix A presents the cover letter to instructors for interview appointment). In this regard, four related professors to subject accepted to participate in an in-depth the interview while mostly all of them discussed the relevancy of the topic in their courses.

Depending on the responses of the instructors, each interview lasted nearly 20 to 40 minutes. The interviews happened during the spring semester, depending on the instructor's schedule. All of the interviews occurred at the department of architecture in the Eastern Mediterranean University. (The transcription of interviews presented in Appendix A).

As Figure 6 shows attendant's professors from left to right are Prof.Dr. Yonca Hurol, Assoc. Prof.Dr.S.MüjdemVural, Asst.Prof.Dr.PınarUluçay and Asst.Prof.Dr. Badiossadat Hassanpour (The CVs of participants presented in Appendix B).

Figure 6: Professors who accepted to participate in Interview

The interview questions are selected from the sample questionnaire in the literature review (Rider, 2010). The instructors were asked the following questions about their view and experiences of integration in sustainability into an architectural curriculum, the helpful courses and projects content and scope, the influence of type of university structure, the conversations surrounding sustainability and green building within architectural education, the role of architect in the realm of sustainability, the biggest barriers to integrating sustainability and the Accreditations requirements regarding sustainability. By such questions, author attempted to realize department board general idea about the level of current and desired integrity of sustainability in architecture education (Interview questions are presented in Appendix A).

3.3.2 Student Questionnaires

The students questionnaires had been distributed among 126 students (female and male) from six design studios in the second, third and fourth year of architecture education (Arch291, Arch292, Arch391, Arch392, Arch491, and Arch492 design studios). In order to find out appropriate result, 30 questionnaires distributed in each design studio. However, 21 questionnaires have returned from each design studios. The study began from the second year because the questionnaire results shows that students are more informed about sustainability subject after the second year. There was no contribution of teaching assistances and studio instructors while responding the questionnaire to remove their effects. The types of questions in the survey are

Likert-type attitude measurement as described by Figure 7. (Appendix C presents the form of students' questionnaire)

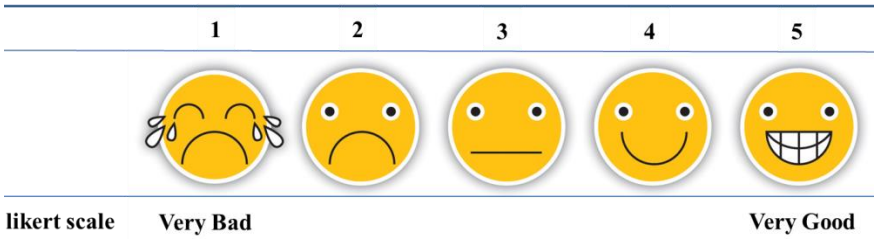


Figure 7: Used Likert measurement levels in student questionnaire

In order to achieve the current situation of integration of sustainability theme in the EMU architectural education by students perceptions about sustainability, 16 questions designed by attention to five core aspects of design studio and architecture curriculum. The sample of questionnaire was based on done questionnaire at similar previous research about the integration of sustainability however it improved in some aspects (Al-Hagla, 2012). The five aspects are as follow; the education location, the curriculum (must courses, elective courses, and the design studios), the external aspects (the student's interest and attention about sustainability), the internal aspects (the involvement of sustainability in theoretical courses, teaching technique, oral studio discussion) and the assessment or evaluation method (the involvement of sustainability in the evaluation of interim submission and final jury comments and criteria). Also, the questionnaire asked two separate questions (question 17 & 18) to find out the students suggestion about the manners of sustainability theme in the specific course or general architecture education.

3.3.3 Analyzing the Curriculum

The aim of analyzing architecture curriculum at EMU as a case study is to find out the level of incorporation of sustainability theme. Analyzing the curriculum has three

categories as follow: EMU Architecture Course Details, Involvement of Sustainability Theme in the EMU Architecture Courses, Integration of Sustainability Aspects. The curriculum categories will explain in the finding chapter comprehensively. The sequence of the courses is based on the first semester to the graduation semester. Analyzing of EMU architecture curriculum shows the level of integrity of sustainability and sustainability aspects in each courses based on the course description, student and teacher idea and NAAB realm in the APR Repot of EMU.

3.4 Direct Observation

After interviewing with tutors and distributing the questionnaires among the six design studios which lead to identifying the current integrity sustainability theme in architectural education, the observation intended to find out the sustainability comments by the jury members in the final submission. The direct observation attempts to discover how much the juries follow the sustainability issue in their evaluations. This observation happened during the final presentation of seven student projects at the chosen case study (EMU department of architecture) from studios ARCH291, ARCH 292, ARCH391, ARCH392, ARCH491, and ARCH492 in the fall semester 2015-2016 (Figure 8).

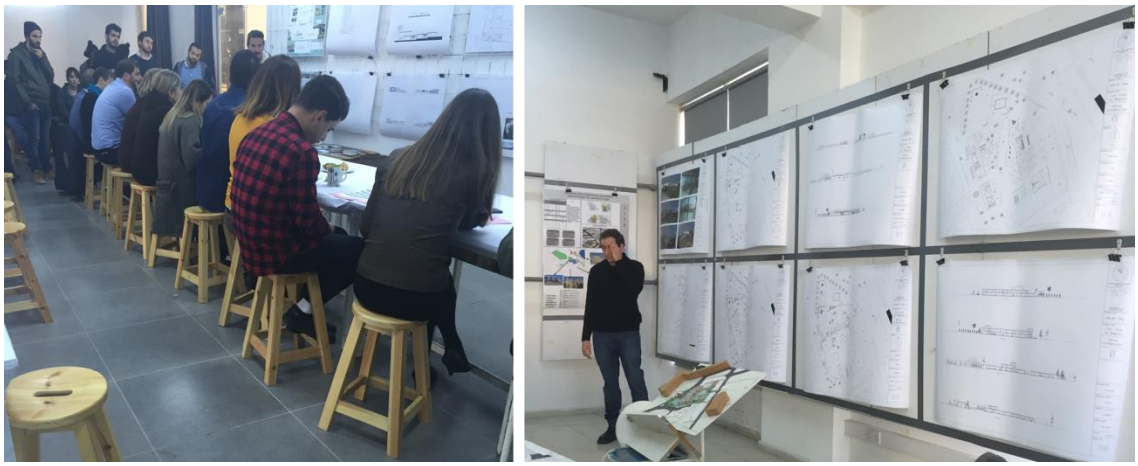


Figure 8: Sample of observed jury sessions at EMU

3.5 Data Analysis

The result of the collected data has been investigated and contributed to the research for increasing the quality of the study. The method of investigating and analyzing the information and documents are the qualitative research. The interviews result with four tutors categorized question by question in the qualitative format. And also the relevant responses from the questionnaire of students have been categorized in the five main aspects of architecture curriculum and design studio by Microsoft Excel Program. They were shown via some graph and bar charts of the attained documents that are an evaluation and comparison of answers across the students.

The curriculum analyzing happened by the aid of course description, student and teacher ideas, and NAAB realms in the APR report of EMU in the format of tables, diagrams and figures .The sequence of the curriculum analyzing is based on the first semester to the graduate semester. Then, the direct observation from the final juries will be categorized based on the instructors' comments in each design studios (Arch 291, 292, 391, 392, 491 and 492). The compatibility and incompatibility in the result

of curriculum, instructors' interviews, students' questionnaires and APR report show the weaknesses and strangeness of the architecture curriculum at EMU.

3.6 Summary of the Chapter

This chapter tracked to present the structure of this thesis. This chapter initially attempted to introduce the Eastern Mediterranean University as the research case study. Next, the instructor interview presented the process of interview, such as the time and the interview questions and the information about the professors who accepted to participate in the Interview. Similarly, the student questionnaire explained the process of questionnaires such as details of questions and the number of participants. Finally, the process of analyzing the curriculum in the department of architecture, as well as the direct observation of common and general comments during jury sessions of design studios at the department of architecture at EMU was described.

Chapter 4

DESCRIPTION OF FINDINGS

4.1 Introduction

This chapter attempts to find out the current integrity of sustainability theme in the EMU architecture education. The important stages is recognized by the results of the interviews with instructors, questionnaire with students, document analysis (curriculum analyze) and direct observation. The outcomes offered in the qualitative and quantitative method by figures, tables and related discussions.

Firstly the instructors' interview result part investigates the data from the in-depth interviews with four members in the department of Architecture to better understand their views and experiences involving sustainability within architectural education. Secondly, the results of the questionnaires discuss about the location, the curriculum, the external and internal characteristic of design studio, and also the evaluation procedure for considering the role of design studio and architecture curriculum in integrating sustainability. Also, document analysis as a next part of this chapter attempts to analyze the architecture curriculum in term of sustainability involvement in the courses by the help of course description, the NAAB report by EMU published in the 2014 (Accessible by EMU portal), instructors and students interview and questionnaire result. In addition, the direct observation happened through final jury days of six design studios (Arch 291, 292,391,392,491 and 492) randomly in the fall semester of 2015. At the end, discussion part will discuss about the results.

4.2 Instructors' Interview Results

To realize department board general idea about level of current and desired integrity of sustainability in architecture education, an in-depth interview has been done in the spring semester 2015. Four professors accepted to participate in the interview (Personal and institutional information of participants is presented in Appendix B). All results are discussed in summary format because of the content analysis and interpretations.

a. **How do you perceive the integration of sustainability into an architectural curriculum?**

As first question, instructors were asked about their views on the level and the quality of integration in sustainability into architectural curriculum. The all participants believe the term "sustainability" is very broad however all its three aspects such as environmental, economic and social needs to be met in architectural education program. One of them believed that architecture curriculum is already arranged according to sustainability since architecture education and its curriculum attempts to teach students way of understanding and fulfilling needs of the users. She supports her idea by giving Vitruvius example "I think the integration has been there from the beginning of the time. For example, Vitruvius in ten books of architecture did not introduce sustainability by this term but he was mentioning about it and all aspects. So it is very old however we lost that" (Interview). "In the architectural curriculum things have been changing due to many reasons, maybe ideological or theoretical reasons. Usage of technology, product base approaches and iconic design approaches could be known as main reasons. User are neglected, context sometimes neglected and many more. (Interview)

One of other interviewers believed that each school has and offers some courses which touches main discussion about sustainability, however some of them might be elective on the other hand she emphasized on the necessity of relating sustainability (at least one of its aspect in each and every course) she gave its structure courses as an example. The other participant refers to her academic experience and believes most of education curriculums in institution are in need of change accordingly but she added it is not that easy. She continued that department of architecture at EMU did many modifications and still is open to the improvement because of many accreditations. She exemplified her statement with the name of courses like ARCH213 (ecology issues in architecture) and course description and objective changes (Interview).

b. **How do you feel sustainability is best incorporated into architectural curriculum and courses?**

One of the instructors commented "if we can really see why we are designing we would keep tracking sustainability." In her view, the best place of incorporating is design studios. "In architecture education it could be expressed that the spine is design studio, and other courses are feeding that spine" (Interview). One of other participant believes there are many theoretical courses but they are not well integrated into architecture design studio. One of the other participants believed that EMU faculty as architecture tries to involve and integrate sustainability not only in courses but also in its student thinking ground. She mentioned the international design week (which the department of architecture at EMU ran since five years ago) and given seminars and workshop in it. One of the interviewed professors asserted that some courses via studies should be completely integrated with sustainability and of course, parallel theoretical courses should be offered to feed them at the same

semester. “All courses can relate themselves to sustainability even the history courses because; we are dealing with conservation and those types of issues” It was mentioned as well that each course according to its objective and level of targeted students can cover some aspects of sustainability in certain level. (Interview)

c. **What kind of projects do you feel work/don’t work for integrating the sustainability in architecture education?**

All of instructors strongly believe the projects such as competition, design studio, extracurricular classes, can work well. One of the instructors mentioned the sustainability should be everywhere and one designer should be aware about the three aspects of sustainability (Social, Economic and Environmental).

d. **How you feel the integrating sustainability in architecture education is best?**

One of the instructors suggested the questioner from students can be a positive way for finding the success of department of architecture. She means department of architecture can evaluate its success in the sustainability by sending questioner to the graduates (interview). Other instructor believed analyzing the curriculum and the observation from design project in the midterm and final jury, finding the most related comments can be appropriate method for finding the success in department of architecture in integrating sustainability in architectural education.

e. **How do you feel the type of university structure might impact the integration of sustainability into architectural curriculum?**

The participants feel the type of university structure might impact the integration of sustainability into architectural curriculum by the influence of mission, the politic or university administrates, increase the amount of related courses. One of the instructor

believed sustainability will be successful if it takes place in the mission of the university. However, other instructor believes to increase the amount of courses that they focus on sustainability issues (Interview). Another instructor answered this question by one example "I am usually giving this question to my students, if you are going to have a tailor made custom, you see him or her in the first appointment and you will check what he is wearing. Accordingly, you will decide he can make a dress for me or not" she means one look at the university structure and evaluate the recto rate acts, the campus, managing of financial issues and how they manage the faculty of students according to sustainability. "So this should not be a way, not the goal to reach but, it should be a path that the university should to walk on." She asserts if the politic that they are using be sustainable (in three aspects), there would be any kind of impact. She believes university administrates should be check the economical sustainability then the social sustainability and then the environmental sustainability (Interview).

f. **What do you think about the conversations surrounding sustainability and green building within architectural education? Are there important connotations and terminologies in play?**

In respond to this question, instructors mention everybody is using these vocabulary and we do not really know what the vocabulary is that. "It is similar to an ocean that nobody is really certain about the terminologies" (Interview).

g. **What role do you feel architects play in the realm of sustainability?**

In answering to this question, most of the respondents mentioned that architects should be viewed and should be position themselves as advocator, leader, experts, facilitators, and specialist because he or she is in the stage of design, and we are in

the teamwork with other professions areas (civil engineers, mechanical engineers, and physics and etc.) One of these instructors believes architect can be as problem solvers, and this thought put us the head of so many other professions but on the other hand she asserts “we should stop thinking that we are the only person that can lead everybody.”

h. **What have been your individual/personal experiences with the integration of sustainability into courses and curriculum?**

In respond to the question, one instructor said that the most of courses are related with sustainability but they are usually elective courses. One participant as an instructor in the structural field supports the challenge of integrating sustainability into curriculum by mentioning Harvard University courses “I have seen about my course in Harvard University, the structure courses have information about sustainability, I said that I should do the same thing, it’s a good action” (Interview).

i. **What elements do you feel are most necessary for sustainability to be successful?**

In respond to what elements could be most necessary for sustainability to be successful, the instructors believe act is the most important element for being successful in the sustainability subject. One of them supported her idea by this example “If I say to students, you should not to be smoking. But, the student sees me in the café that I am smoking, will he trust me? No.”, “I can talk about sustainability in one class for hours, but if I don’t act like that, it doesn’t work.” She supports her idea by another example in the class. She explains that she was giving students the attendance paper that it was white just on the one side “they said what this is. And I said I am using the back side of paper, because we do not have enough resources to

spend." Another instructor asserted; we need time and deep road for change. "Usually the words are there but the practices are much later" (Interview).

j. **What could be the most important in integrating the sustainability in architecture education?**

One participant without any introduction says that thinking for human and human needs is the most important thing. She improves her ideas by this example. "Half of the world does not have clean water. I mean what we have in the toilet, is the drinking water of half of the world or if I taking three showers per day, if I spending that much of the water, so, what do I do talk about sustainability" (Interview). Another instructor thinks people are the most important values because they create buildings, cities, politics, and they make the difference. The next participant believes the ethical approach is the most significant matter. "When one has ethical feeling towards the world or everything around the world, then, he or she will tend to behave more sustainable way" (Interview).

k. **What types of conversations do you feel are necessary to have regarding sustainability and green building – both in the classroom and with faculty?**

In respond to what types of conversations are necessary to have regarding sustainability; instructors mention to the mission of university. They believe if it takes place in the mission of university, faculty and department then it will be entering to everywhere. One instructor supported this idea by one example, "I had an experience in the middle east technical university after 1990 earthquake, the dean of the faculty said that this year will be dedicated for earthquake problems, so, all courses should relate themselves somehow to earth quick problems and safety of people in my faculty. I think something like that, might be good initiate" (Interview).

l. **Who needs to be around the table for these conversations? How do we get these people around the table within courses?**

In the respond to this question, one participant says if dean care about something such as this topic, then it will be the announcement to whole of faculty. So, finally, it will be discussed and it will be accepted. Another instructor challenged this idea by her comment. She asserted the conservation table is very big and wider than just dean and faculty members. “There has to be politics, economic people, administrator and exporters, because we will not be successful in sustainability by just having scientific world.” She mentioned the importance of other people in the decision for sustainability and she believes if they don’t let architects to design and act, how we can solve the problems. “Who is going to let me design? The administrators, who is doing roles and recreations? The politics. So, they should be all there. It is not related with education and courses” (Interview).

m. **What is your opinion about the necessity of interdisciplinary approach?**

In direct question from the interview guide, all these faculty members are questioned about their opinions and interest on interdisciplinary work. All of them believe interdisciplinary work is vital for being prosperous in the design. One instructor commented architecture is an interesting area because our courses are very diverse and all of them relate to different subjects. She supports her idea by one example. “When architects talk about structures, they are related to structure engineering and when they think about acoustic there is an acoustic engineering or when they think about climatic issues, mechanical engineering is dealing with these types of things.” She believes architects should know what everybody is doing and she says about the

current status “At the moment, there is little relationship, only in the graduation level, we invite these people to come and see our student projects, but it’s not about sustainability, we just use their opinion about the projects around their own subjects” (Interview). Other instructor started her response by mentioning to master and PhD’s thesis. She asserts that we are not more talking about building form, space of organization, the form of organization in the master thesis and PhD thesis from last couple of years. There are many other issues that are coming in to our field now. She improves her idea by this example “when my students come for having PhD or master thesis, they sound like don’t study architecture. It’s like something else.” That means the field of architecture is going to be more interdisciplinary things. She believed it is telling us the profession is changing because we need this change. (Interview)

n. **What do you personally feel are the biggest barriers to sustainability being a constant theme in architectural education?**

The biggest barrier in integrating sustainability as one of the participant’s view is the ethical feeling. She improve her idea by this example “if most of the people do not have ethical feeling and it introduces as a kind of fashion, everyone wants follow the fashion, so, they follow it, but if they don’t feel it really, it will just spark and it will be finish very soon”. Other instructor believes the biggest barrier is the years of education because instructors attempt to give the students much information and sustainability is only one of them (Interview).

o. **How do you feel that sustainability is incorporated into the NAAB Accreditation requirements?**

At the last but not least, in a direct question from the interviewer, all participants are asked about their view and feeling on incorporating sustainability into the NAAB requirement. Most of instructors feel the sustainability issue is kind of related in the perspective of the NAAB. However one instructor believes that the structure and the process of the NAAB accreditation are not completely sustainable because the university spends too much paper for each visit of NAAB accreditation. She commented "last time, one team of NAAB accreditation came and ask us to create the files, we change to another format, again copy, so, I do not realize any sustainability however they do put sustainability issues, and they want be sure that we do care for sustainability issues in our curriculum" (Interview).

This study was based on depth interviews with four expert's faculty members in Eastern Mediterranean University within related field.

4.3 Students' Questionnaire Results

Student questionnaire was distributed at each design studios during 2015- 2016 fall semester. The participants were from six design studios in the second, third and fourth year of architecture education (Arch291, 292, 391, 392, 491, and 492 design studios). The study started from the second year because the students are more informed about the design process and also the sustainability subject. A sample of 126 students (female and male) completed the questionnaire. There was no contribution of faculty member same as studio instructors and teaching assistances while answering the questionnaire to eliminate their influences.

The questionnaire had sixteen questions based on the likert measurement. (Appendix C presents the form of students' questionnaire). The questions (1 to 16) designed by attention to five core aspects of design studio and architecture curriculum for understanding and integrating sustainability theme in architectural education. This

sample was based on done and presented studies at chapter two. The included five aspects are as follow; the location of study, the curriculum (must courses, elective courses, and the design studios), the external aspects (the student's interest and attention about sustainability), the internal aspects (the involvement of sustainability in theoretical courses, teaching technique, oral studio discussion) and the assessment / evaluation method (the involvement of sustainability in the evaluation of interim submission and final jury comments and criteria). Also, two individual questions asked the students recommendation or suggestion about manners sustainability theme in the specific course or general architecture education. This section will discuss the outcomes from the student's questionnaires. The structure of data is based on each of the question.

The results of each aspect (place, curriculum, external aspects, internal aspects and assessment / evaluation) are shown in the relevant Figure. In addition the outcome of the all questions is categorized in the Table 3. In this regard the Table 3 expounds the results of questionnaire vertically and horizontally, because it attempts links the six design studios of the study and also to evaluate different aspects in the similar level. One column is provided to show the average result from each question in the Table 3. The objective of the average column in this Table was to find out the average result in likert measurement from scale of one to five for all respondents in each design studio. By this column a comparison can create between the results of design studios for all these five aspects. This column is highlighted by another color.

Table 3: Findings of the questionnaire regarding all the five categories

QUESTIONS	RESULT						
	Arch291	Arch292	Arch391	Arch392	Arch491	Arch492	AV
1.Place To what extends do the studio location affect your sustainability understandings?							
1.1 S classes (near to hidden cafe)	2.9	3.3	2.7	1.7	2.6	2.7	**2.6**
1.2 Color building studios	3.6	2.2	3	3	2.9	3.6	**3**
1.3 Banda bulya (old town)	1.7	2.1	2.5	1.8	1.3	1.7	**1.8**
2.Curriculum							
2.1. How much the previous studied must courses (architectural courses) have influenced in your understanding of sustainability?	3.4	4	3.4	3.5	3.6	3.7	**3.6**
2.2. How much the previous studied must courses (tectonic courses/engineering courses) have influences in your understanding of sustainability?	3.3	3.7	2.9	3.7	3.5	3.5	**3.4**
2.3. How much the previous studied Faculty elective courses have influences in your understanding of sustainability?	2.2	2.3	2	2.2	2.6	2.5	**2.3**
2.4. How much the previous design studios have influenced in your understanding of sustainability?	3.9	3.9	3.6	3.4	3.4	4	**3.7**
3.External aspects (outside the studio)							
3.1. How much are you interested about sustainability and its related aspects?	3.9	4.4	3.4	4	3.8	4.1	**3.9**
3.2. How much did you pay attention to the cost or other sustainable items (environmental/ economic/ social) in your project?	3.4	3.7	3.6	3.6	3.1	3.7	**3.5**
4.Internal aspects (inside the studio)							
4.1. How much do you feel sustainability currently involves in your theoretical courses?	2.4	3.4	3	3.3	2.9	3.2	**3**
4.2. How much you feel the sustainability is involved in teaching technique in the design studio?	2.9	3.4	3.3	3.1	3	3	**3.1**
4.3. How much do you feel the sustainability has been brought into your oral studios discussion?	3.2	3.1	3	2.8	2.5	2.7	**2.8**
4.4. How much do you discuss about your design proposal with any experts regarding all sustainability aspects?	3	3.5	2.4	3.1	2.6	2.9	**2.9**
5.Evaluation							
5.1. How much do you feel the sustainability is involved in evaluation of your design proposal in Interim submission?	2.8	2.9	2.6	2.9	2.6	2.7	**2.7**
5.2. How much do you feel the sustainability is involved in the jury discussion and evaluation of your final jury?	3	3.7	2.8	3.2	2.8	3.2	**3.1**

The first of these aspects is the place of the study that question about the influence of the environment on the integration of sustainability. The objective of this question was to find out the better location between three main locations of department of architecture for the design studio regarding the incorporation of sustainability and its three aspects (environmental, social, economic).

The result shown in the Figure 9 reveals the influences of the design place on achieving sustainability understandings. The Color building studios at EMU were selected the highest scored in compared with the S studios classes (the second) and the Bandabulya studio in the old town of Famagusta (the third) from the student's opinion in the all design studios except of Arch 292. The respondents in Arch 292 choose S classes (same place with their class) as a best place between these three places for understanding better sustainability.

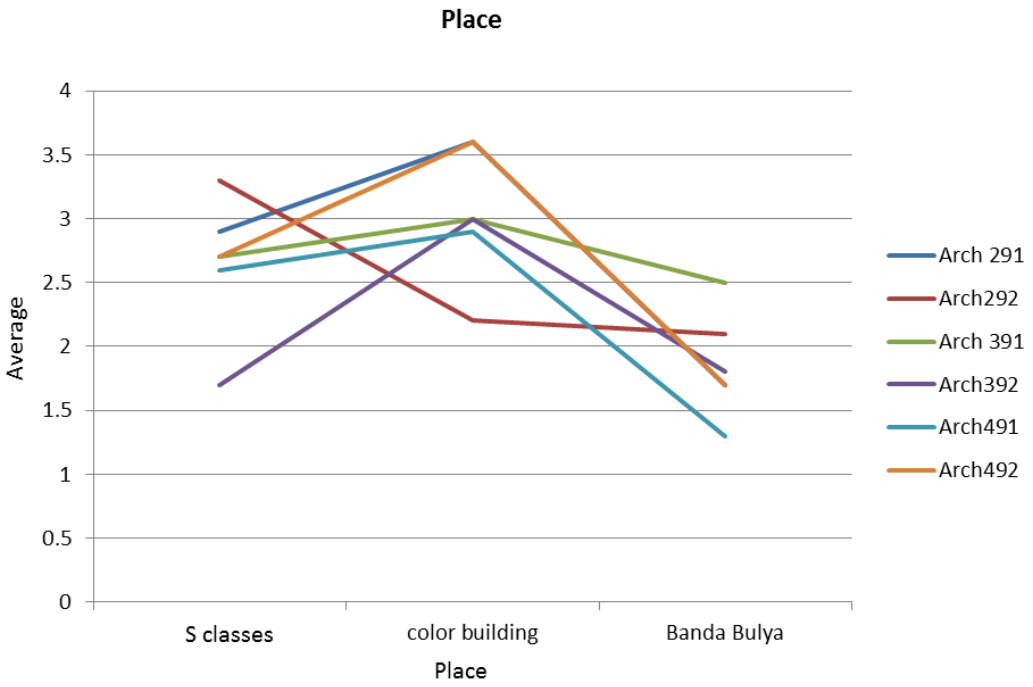


Figure 9: The student's Answer to the question: to what extends do the studio location affect your sustainability understandings?

One of the students that had experiences in all three places mention “the color building enables them to think about the economic and social aspects and the Banda Bulya is impressive for in terms of creativity understanding on environmental and social aspects of sustainability. Also the S classes are good situation for understanding better environment sustainability because of the location, architectural features, sizes and etc.

The curriculum as the second aspect was questioned. Students were expected to evaluate the influence of offered courses in architecture program (such as must courses, engineering course, faculty elective courses and the pervious design studios) in constructing their understanding about sustainability. By these questions students were going to rate the influence of courses. The aim of these questions was to find out the knowledge of sustainability along the educational process.

As Figure 10 indicates, the previously studied architectural must courses, engineering course (tectonic) and design studios are showing a similar high rate, between 3 to 4 grades. On the other hand the previous studied elective courses illustrate minor influences. Although interview with instructors were revealing presence of remarked elective courses relevant to sustainability (compare to number of offered courses) but the result of student’s questionnaire shows still need of its existence. The questionnaire’s result illustrate high rate in the effect of previous design studios in the ARCH 492 as the last design studio (graduated studio) for understanding sustainability.

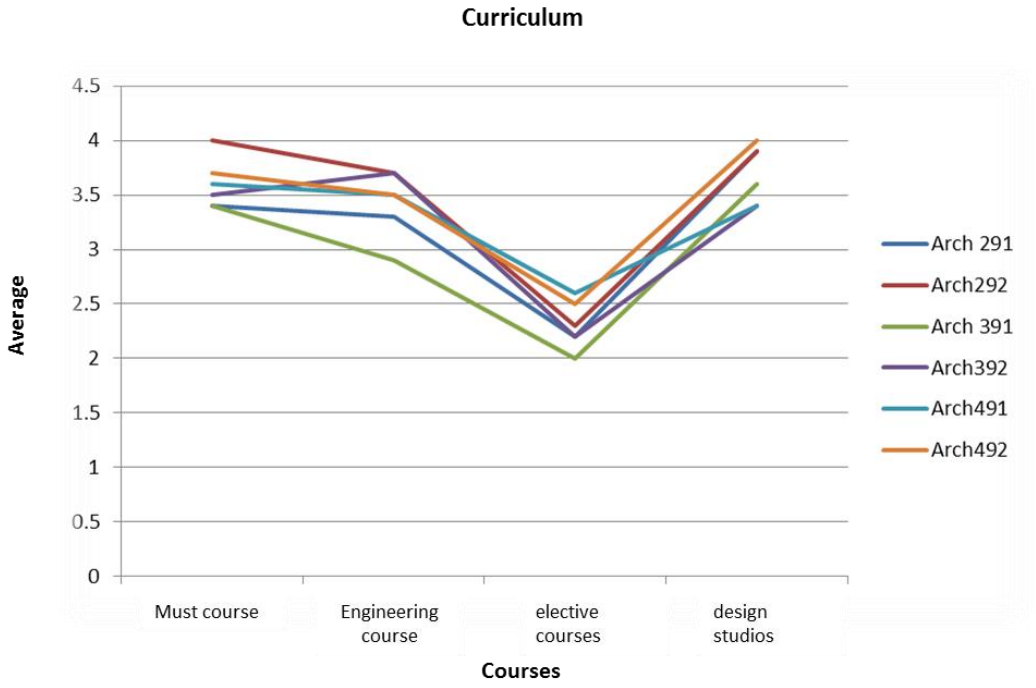


Figure 10: The Students' Answer to the question: How much the previous studied (must courses, engineering courses, elective courses, design studios) have influenced in your understanding of sustainability?

Also, in this part, students were asked about courses that have influence on their understanding about sustainability. This question could help author to understand how they can relate course content with their later usage. Obtained results from the questionnaires indicate Arch 114 (Human and Socio-cultural Factors in Design) and Arch 213 (Ecological Issues in Architecture) were pointed by all design studios students as a place of creating proper understanding the sustainability.

The external aspect as the next part was questioned. The students were expected to evaluate the influence of the external aspects of the design studio in the two questions. This part considers their interest about sustainability and its related aspects, and their attention to the cost or other sustainable items (environmental/ economic/ social) in their project. Figure 11 reveals that the characteristics from outside the design studio (external aspects) play the crucial role in achieving

sustainability comprehension. The participants give a high rank to their interest to sustainability subject. It shows that the students are enthusiastic about sustainability in their design project or research projects. Based on another question in this part, they acclaim that they pay attention to the cost and other aspects of sustainability in their project in the high rate. As Figure 11 indicates, the students are interested about sustainability and they pay attention to this subject in their design projects because all the averages are upper than 3. However, the result of this question creates another question; does the sustainability happen in the architecture curriculum certainly? The discussion part will attempt to find out the result of this question.

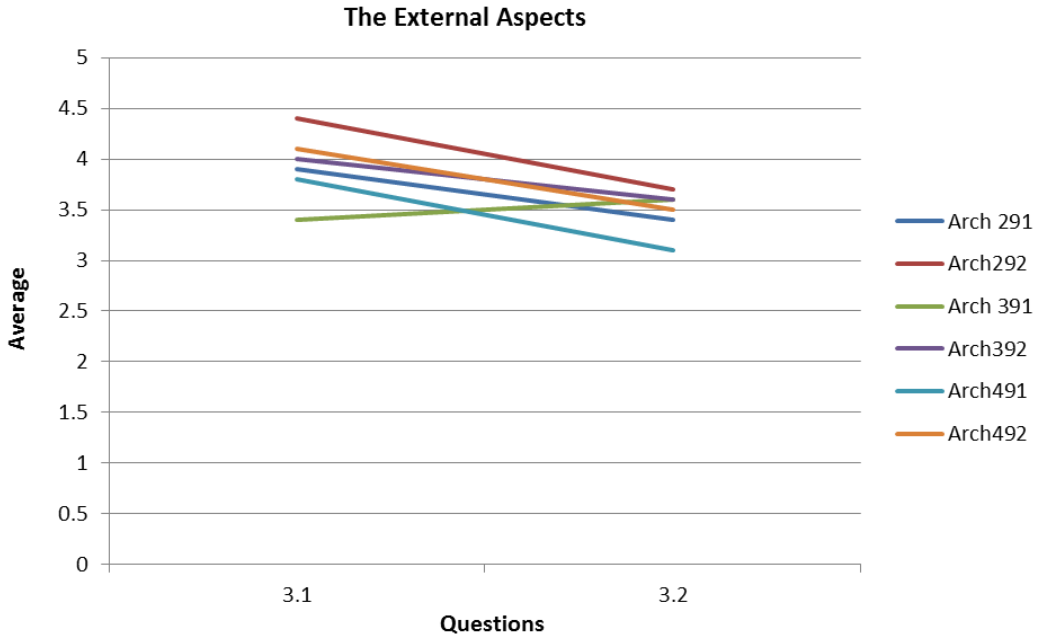


Figure 11: The Students' answer to the external aspects questions
3.1. How much are you interested about sustainability and its related aspects?
3.2. How much did you pay attention to the cost or other sustainable items (environmental/ economic/ social) in your project?

Internal aspects as the fourth aspect were questioned. The students were expected to evaluate the features inside the studio (such as the role of integration of sustainability in the theoretical lectures, instruction method in the design studio, the discussions in

the studio with respondent's colleagues and the discussion about design proposals). As it is shown in the Figure 12, the participants give a high rank to the teaching technique in the design studio regarding sustainability. It shows that the teaching technique is the most important factor of achieving a comprehension of sustainability. Furthermore, the theoretical courses (about sustainability aspects) have a considerable contribute on. By attention to Figure 12, oral studios discussion regard sustainability has the lowest score between all aspects from this part. The aim of oral discussion is the conversation about sustainability in the design studios. Therefore it shows the design studios need more discussion about sustainability during the time of the class. But, the result of this question creates another discussion; it can be possible the instructors talk about sustainability; however the students do not know about the terminologies and definitions. Therefore, probably, the problems are the definitions and terminologies regarding sustainability.

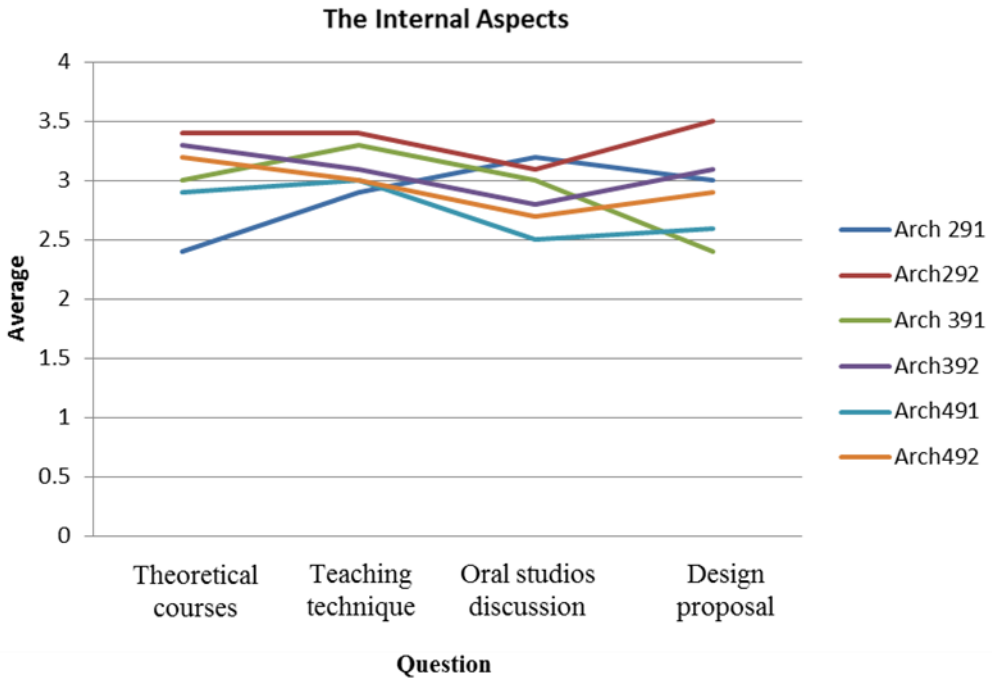


Figure 12: The responses of students to the question: How much do you see sustainability currently involves in (theoretical courses, teaching technique, oral studios discussion, your design proposal with any experts)?

In addition, two other questions in the internal part investigate the sustainability aspects (environmental, social and economic) from two subjects. The questions ask "To what extends do the following items (environmental, social and economic aspects) give importance to your design proposal?" And also "To what extends do the following items (environmental, social and economic aspects) give importance to the guidance presented in design studio by teaching staff and assistances?"

The findings of the questionnaire in these two questions indicate the unbalanced significance given to diverse sustainability aspects. The environmental aspect has the highest scores as the first one, social aspect as the second and economic as the third (please read the Table 4). It could be perceived that there are essential needs for more leadership in design studio regarding to economic and social aspects of sustainability.

Table 4: The findings of the questionnaire based on sustainability dimensions.

Design proposal stage							
Environmental sustainability	3.9	3.8	3.7	3.2	3.5	4	**3.7**
Social sustainability	3.2	3.3	3.5	3.2	3.4	3.7	**3.4**
Economic sustainability	3	3.1	3.4	2.3	3.1	3	**2.9**
Comments by tutors							
Environmental sustainability							
Social sustainability	3.3	3.6	3.7	3.4	3.1	3.3	**3.4**
Economic sustainability	2.7	3.2	3.3	3	3.3	2.8	**3**
	2.7	2.9	3.1	2.5	2.8	2.3	**2.7**

Evaluation comes as the final step in drawing a comprehensive vision of embedding sustainability understandings in studio-based architectural education. Figure 13

shows sustainability is involved in the jury discussion and evaluation of the final jury more than average rank. In addition, all levels show a slight better change in score between the interim submission evaluations and the final evaluation within the design studio, which reflects a prosperous process from interim to final jury evaluation. This result is supported by the author observation.

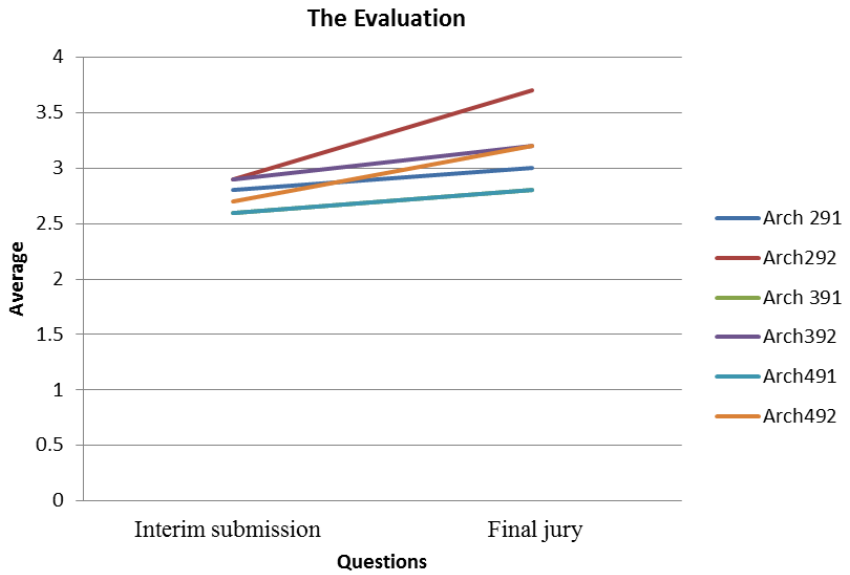


Figure 13: The responses of students to the question: How much do you see the sustainability is involved in evaluation of your design proposal in (Interim submission, final jury)?

All in all Table 3 and all the previous diagrams from the questionnaire result show a maximum grade of the ARCH 292 according diverse factors compared with the other design studios. It shows that students are more satisfied from understanding sustainability in this level of their academic education.

At the end of questionnaire, two questions ("What type of activities can help us to increase integration of sustainability theme in the architectural curriculum?" and "Do you have any suggestion to increase integration of sustainability theme in the architectural curriculum?") ask about student's recommendation as a helpful way to

increase integration of sustainability theme in architectural education. As Results are illustrated in Figure 14 most of the respondents believe the design project can be helpful way to increase integration of sustainability theme in the architectural education. The research project and workshop have a high rate after design project. This result is supported by instructor's opinion when they said "in architecture education it could be expressed that the spine is design studio, and other courses are feeding that spine" (Interview).

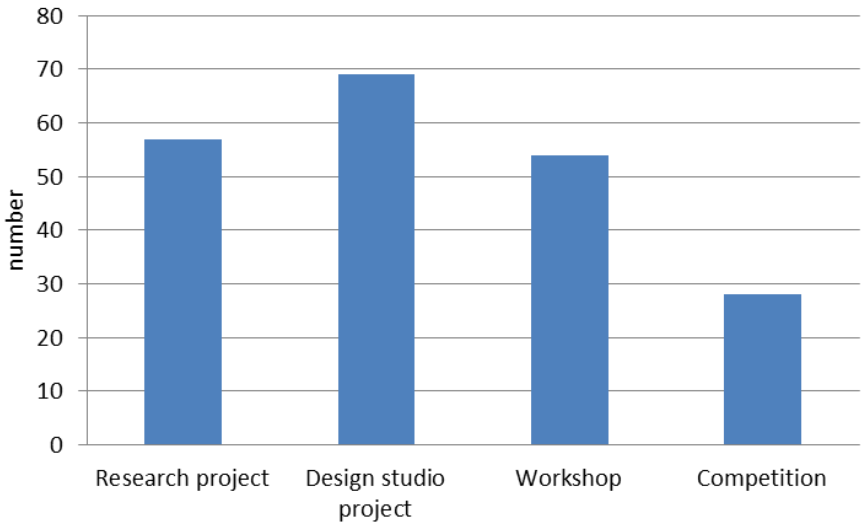


Figure 14: The Students' answer to the Question "What type of activities can help us to increase integration of sustainability theme in the architectural curriculum?"

And also, in respond to the last question ("Do you have any suggestion to increase integration of sustainability theme in the architectural curriculum?"), the main given comments according to integrating sustainability in architectural education are such as; helpful seminar and work shop, improving the curriculum, more related topic and the research project about the aspects of sustainability.

4.4 EMU Architecture Curriculum Analysis Results

The EMU architecture curriculum will be analyzed regarding the sustainability integration in this section. The objectives of Table 5 are to find out the level of

integration of sustainability theme in the EMU architecture curriculum. And also, it can recognize the possibilities for improving the involvement of sustainability in the EMU architecture curriculum and could be proper lessons for other universities in case of any enthusiasm to development of their educational curriculum. As Table 5 indicates three main categories such as; EMU Architecture Course Details, Involvement of Sustainability Theme in the EMU Architecture Courses, Integration of Sustainability Aspects are used to discuss the reality of education in department of architecture at EMU.

The EMU Architecture Course Details as a first category indicates the general information about the courses such as the semester, course title, course code, prerequisite, course descriptions and objectives. The objective of semester's column was to find out the level of involvement in sustainability based on the years of study. And the prerequisite column shows the required deficiency courses for each course. The objective of this column is to find out the supportive pre-requisite theoretical courses regarding sustainability. The sequence of the courses is based on the first semester to the graduate semester.

Involvement of sustainability theme in the EMU architecture courses as a second category shows the availability of sustainability in each course based on the EMU architecture course description, the student's questionnaires, teacher's interviews and NAAB realm in the APR Report of EMU. Course description column shows the availability of sustainability based on the course description of NAAB report from EMU faculty of architecture in 2014. Student's questionnaires column indicate the student's opinion about the integration of sustainability in architecture education. The students are asked "Which courses providing proper support about usage of

sustainability aspects? And which aspects of sustainability do you see in these courses? Why?" This question asked from the students (ARCH291, 292, 391, 392, 491, and 492) and involved teaching assistants in the studios to find out the student's perceptions. The instructors' interview shows the related teacher's opinion about level of sustainability involvement in their given courses. The EMU APR report column indicates the availability of sustainability in each course based on the NAAB conditions which are related to sustainable issues of architecture. NAAB has 13 conditions for accreditation which four of them are related to sustainability in architecture, as follow; B.3 (Sustainability), B.6 (Comprehensive Design), B.8 (Environmental Systems) and B.12 (Building Materials and Assemblies). More description of the NAAB's condition explained in the literature review (page: 55).

The NAAB Report of EMU Architecture Program in 2014 addressed B.3, B.6, B.8 and B.12 in the description of some architecture courses in the EMU. As it shown in the column of EMU APR Report, each course is evaluated based on NAAB realm. The description of findings as the last column in this category explains the availability of sustainability in each course.

Finally, the third category as the integration of sustainability aspects shows the availability of sustainability aspects (environment, economic and social) in each course based on the student questionnaires, related instructors interviews and EMU architecture course description to find out the level of environment, economic, and social aspects of sustainability involvement in architecture curriculum.

Table 5: the Availability of Sustainability Theme and Sustainability Aspects in the Eastern Mediterranean University Architecture Curriculum (designed by Author)

Course Details In term Department of Architecture, EMU					Involvement of Sustainability Theme in the Courses Department of Architecture, EMU					Integration of Sustainability Aspects		
Semester	**Course Code**	**Course Title**	**Pre-requisite**	**Course Descriptions and Objectives**	**Course Descriptions**	**Case Study: Student Questionnaires**	**Case Study: Teacher Interviews**	**EMU APR Report**	**Description of Findings**	**Environment**	**Economic**	**Social**
1	**FARC 101**	BASIC DESIGN STUDIO		The course creates a visual vocabulary through 2 and 3-dimensional exercises; design elements and design principles; problem-solving exercises to enhance students' mental and manual skills; and with emphasis on creativity, and critical thinking.								
1	**FARC 113**	INTRODUCTION TO DESIGN		The course introduces basic vocabulary of art and design, their elements and organizational principles, visual perception and the role of culture in the design process.								
2	**FARC 102**	INTRODUCTORY DESIGN STUDIO	FARC 101	Exercises on forms, space, function, material, structure and scale, the transition from abstract problems to concrete ones, the role of cultural and physical dimensions in design.		*	*		• Students commented their course project focused on **environment** aspect of sustainability. Because the location of their project is the seaside.(Student questionnaire) • The related instructors to FARC 102 asserted that there is **environment** aspect of sustainability in the course content.(Interview)	*		
2	**FARC 142**	INTRODUCTION TO DESIGN TECHNOLOGY		Integration of design thinking with the appropriate structure, and technology; structural logic, form and structure, material and form, the evolution of technology and material in time.		*	*		• Students commented this course deal with **economics** and **environmental** issues. (Student questionnaire) • The related instructors believe this course mention to **three aspects** of sustainability but the focus is on the environment aspect. (Interview)	*	*	*
2	**ARCH 114**	HUMAN AND SOCIO-CULTURAL FACTORS IN DESIGN		This course contains a survey of relations between the human being as the primary determinant in shaping built environment, **social/ cultural factors**, and architectural design. Investigating key issues of social and cultural life including interaction between individuals from various user groups in reference to private, public, semi-private and semi-public spaces in and around other buildings	*	*	*		• Students commented this course lead us to **social** sustainability design by attention to human needs and ergonomics. This course deals with relations between humans, sociality, and design.(Student questionnaire) • The related instructors asserted that there are the **environment** and **social** aspects of sustainability in the course content.(Interview)	*		*
3	**ARCH 291**	ARCHITECTURAL DESIGN STUDIO 1	FARC 102 FARC	Develop an understanding of form, function and space relations through exercises with limited complexities emphasizing on site and literature survey, function and	*	*	*		• The related instructors believe there are **three aspects** of sustainability.(Interview) • Students asserted this course has **environmental** and **social**	*	*	*

			103	programmatic requirements, **human and social factors**. Students are expected to deal with the main issues of designing a **social and communal building** for a specific user group (aged, interest, activity group, etc.) in the characteristic rural-vernacular context; to combine functional requirements with the fundamental space qualities in relation to site qualities.					**aspects** of sustainability.			
3	**ARCH 213**	ECOLOGICAL ISSUES IN ARCHITECTURE		It focuses on **ecological sensitivity** in consideration of natural and technological processes that shape the built environment in terms of **social, cultural and natural environment**. Learning Terminologies and concepts such as ecological, sustainable, green and others. Understanding ecological design topic in general through worldwide causes learning ecosystem. Primary reasons and arguments for the rapidly expanding Sustainable architecture and its various.	*	*	*	**B.3.**	• Architecture Program Report for 2014 NAAB addressed B.3 (Sustainability) in the description of this course in the EMU university.(EMU APR Report) • Students asserted this course has **three aspects** of sustainability. This course attempts to introduce how to design sustainable building by focusing on relevant factors (eco-friendly design model) but, not deeply.(Student questionnaire) • The related instructors asserted that we mention to **three aspects** but it is not our main focuses in the course content.(Interview)	*	*	*
3	**ARCH 225**	HISTORY AND THEORIES OF ARCHITECTURE 1		This is a survey of the evolution of architecture through a theoretical perspective covering a timeline from prehistory to the end of the Middle Age.			*		• The related instructors asserted that there are **three aspects of sustainability** in the course content. "I believe that all courses can relate themselves to sustainability even the history courses because we are dealing with conservation and those types of issues". (Interview)	*	*	*
3	**ARCH 235**	INTRODUCTION TO TECTONICS OF STRUCTURAL SYSTEMS		A course aiming the investigation of the architectural meaning of "structures". Study of tectonics in masonry and flexural structures via successful case studies.								
3	**ARCH 243**	ARCHITECTURAL CONSTRUCTION AND MATERIALS1		This course will deal with the structural basic components of a building. Those were named as foundations, beams, walls, slabs and roof elements. Reuse and **environmental impact** of construction materials.	*	*	*	**B. 12**	• Architecture Program Report for 2014 NAAB addressed B.12 (Building Materials and Assemblies) in the description of this course in EMU university.(EMU APR Report) • Students asserted Arch243 has a brief explanation about **economic** and **environment** sustainability.(Student questionnaire) • The related instructors asserted that there are the **environment and economic aspects** of sustainability.(Interview)	*	*	
3	**ARCH 190**	SUMMER PRACTICE 1		The students of the Department of Architecture should have training besides their architectural credit courses for their graduation. Therefore, the department of Architecture, at certain times of the year independently or together with other departments, organizes technical trips/workshops or approves their arrangement.			*		• The related instructors asserted that there is **environment** aspect of sustainability in the course content.(Interview)	*		
4	**ARCH 292**	ARCHITECTURAL DESIGN STUDIO 2	ARCH 291 FARC 104	A studio course designed to develop an understanding of form, function and space relations with an emphasis on site and immediate **environment**, construction techniques, materials. To examine holistic design approaches initiated from an architectural scenario to site and **environment** (design with nature: using topography in design, sun/wind orientation and other climatic factors), spatial	*	*	*		• This course deals with **environment** and **social** factors in neighborhood scale because it teaches students to take benefits from the natural characteristic of the site in their designs.(Student questionnaire) • The related instructors asserted that there are **three aspects of sustainability** in the course content. (Interview)	*	*	*

				needs in relation to **social factors**, appropriate construction techniques, materials, and details (including roof, stairs, and other building components).									
4	**ARCH 226**	HISTORY AND THEORIES OF ARCHITECTURE 2		Evolution of architecture and art in Europe and Asia from the rise of Renaissance until the developments during the 18th and 19th centuries and, contemporary architecture until the end of 20th century.			*		• "I believe, that all courses can relate themselves to sustainability even the history courses because we are dealing with conservation and those type of issues" The related instructors stated, there are **three aspects of sustainability** in the course content.(Interview)	*	*	*
4	**ARCH 236**	TECTONICS OF FLEXURAL STRUCTURES	ARCH 235	A course covering the relationship between structural behavior, form, and tectonics for flexural structures, via successful case studies.									
4	**ARCH 244**	ARCHITECTURAL CONSTRUCTION AND MATERIAL 2	ARCH 243	Provide knowledge and skills required for wide span roof structures stairs, windows, and doors with their own detailing. All kinds of possible construction methods with their special finishing details will be dealt. Reuse and **environmental impact** of construction materials.	*	*	*	**B. 12**	• Architecture Program Report for 2014 NAAB addressed B.12 (Building Materials and Assemblies) in the description of this course in EMU university.(EMU APR Report) • Students asserted Arch244 has a brief explanation about environment sustainability.(Student questionnaire) • The related instructors asserted that there are **environment aspects** of sustainability in the course content.(Interview)	*		
4	**ARCH 246**	ENERGY AND ENVIRONMENTAL ISSUES IN DESIGN		A course to study the **environmental** factors influencing architectural design. This course mentions to issues of climate, lighting, and acoustics in relation to energy problems, how to use meteorological data, thermal comfort, effective temperature, identification of climate, solar control, condensation, wind control and natural ventilation.	*	*	*	**B.3 B.8**	• Architecture Program Report for 2014 NAAB addressed B.3 (Sustainability) and B.8 (Environmental Systems) in the description of this course in EMU university.(EMU APR Report) • Students stated **all of the sustainability aspects** are mentioned in this course.(Student questionnaire) • The related instructors asserted that there are **three aspects of sustainability** in the course content.(Interview)	*	*	*
4	**ARCH 252**	THEORY OF URBAN DESIGN		An introductory course on the basic understanding of urban design as a discipline integrated with architecture. Basic understanding of urban design issues, City, **responsive environments**, urban space, public realm	*	*	*		• Students asserted the **environment** and **social** aspects are mentioned in this course.(Student questionnaire) • The related instructors stated that there are the **environment** and **social** aspects of sustainability in the course content. But it focuses on environment aspect more.(Interview)	*		*
4	**ARCH 290**	SUMMER PRACTICE 2	ARCH 190	Practice at a certain construction site(s) must be verified and reported through consistent documenting, photocopy, and daily activity reports.			*		• The related instructors acclaimed that there is **environment** aspect of sustainability in the course content.(Interview)	*		
5	**ARCH 391**	ARCHITECTURAL DESIGN STUDIO 3	ARCH 292	A studio course designed to provide the student with skills of designing in urban context considering various urban problems, historic **environment**, urban context, **socio-cultural** issues, **open and semi-open** organizations	*	*	*		• The subject of the term project moves toward urban design so, students are facing with the impacts of the natural environments (**environmental sustainability**) in their designs and have been forced to think more rationally to open and semi-open spaces (**social sustainability**) in their proposals.(Student questionnaire) • The related instructors asserted that there are **three aspects of sustainability** in the course content but it mentions on social aspect more than other aspects.(Interview)	*		*
5	**ARCH 311**	PRINCIPLES OF CONSERVATION AND RESTORATION		Theory of conservation, basic knowledge, and understanding of cultural heritage and its conservation, international regulations, causes of deterioration in historic buildings, conservation of historic **environments**. The impact of new building designs in historic environments.	*	*	*		• Students asserted the **environment** aspect is mentioned in this course.(Student questionnaire) • The related instructors asserted that there are **three aspects of sustainability** in the course content.(Interview)	*	*	*
5	**ARCH 337**	TECTONICS OF FORM RESISTANT		A course covering the relationship between structural behavior, form, methods of construction, and tectonics								

		STRUCTURES		for form- resistant structures, via successful case studies									
5	**ARCH 347**	ARCHITECTURAL CONSTRUCTION AND MATERIALS 3		Industrialized and prefabricated building techniques (tunnel formwork, skeleton, panel, modular construction systems), building envelopes (structural, nonstructural, classification according to the materials) and their construction characteristics. Reuse and **environmental impact** of construction materials.	*	*	*	**B. 12**	• Architecture Program Report for 2014 NAAB addressed B.12 (Building Materials and Assemblies) in the description of this course in EMU university.(EMU APR Report) • Students stated this course explain about **economic** sustainability aspect briefly.(Student questionnaire) • The related instructors asserted that there is environment aspect of sustainability in the course content.(Interview)	*	*	
5	**ARCH 355**	PROCESS OF URBAN DESIGN		Knowledge is firstly imparted through series of lectures, then developed through the undertaking of project work designed to ensure the application of theory to practice. The course mentions to the theoretical foundation of urban design, Urban context, urban **environment**, **climate**, circulation.	*	*	*		• Dealing with natural characteristics of the site and climatic consideration in design has positive effects on students' ability to create sustainable conditions in their architectural designs. This course focuses largely on **environment** factor.(Student questionnaire) • The related instructors stated that there is **environment** aspect of sustainability in the course content.(Interview)	*		
6	**ARCH 392**	ARCHITECTURAL DESIGN STUDIO IV	ARCH 391	Designing buildings with high complexity in functional; integration of appropriate structural and **environmental** control systems, materials, building codes and regulations in the urban context.	*	*	*	**B.6.**	• Architecture Program Report for 2014 NAAB addressed B.6 (Comprehensive Design) in the description of this course in EMU university.(EMU APR Report) • Students asserted this course mention to **environmental** sustainability in the course content.(Student questionnaire) • The related instructors stated that there are **three aspects of sustainability** in the course content. But the economic aspect is more important than other two aspects.(Interview)	*	*	*
6	**ARCH 348**	BUILDING AND ENVIRONMENTAL SYSTEM IN ARCHITECTURE		This course aims to study all kinds of sanitary and **environmental** systems in buildings and their approximate size prediction. The course mentions to **energy systems**, mechanical conveyors, fire systems, lighting, security	*	*	*	**B.8.**	• Architecture Program Report for 2014 NAAB addressed B.8 (Environmental Systems) in the description of this course in EMU university.(EMU APR Report) • Students asserted that the basic objectives and methods in sustainable design regarding **three aspects** are introduced in this course for the architecture students.(Student questionnaire) • The related instructors stated that there are **three aspects** of sustainability in the course content.(Interview)	*	*	*
6	**ARCH 390**	SUMMER PRACTICE 3	ARCH 190	Students are expected to contribute to the design and/or technical drawings of the application projects (house, shop, office, restaurant... etc.) of a single project or several projects lead by the institution that the student is practicing with. Working in Office, urban scheme			*		• The related instructors asserted that there is **environment aspect** of sustainability in the course content.(Interview)	*		
7	**ARCH 491**	ARCHITECTURAL DESIGN STUDIO V	ARCH 392 FARC 111 FARC 142 ARCH 114 ARCH 213 ARCH 281 ARCH 226 ARCH	A studio course designed to provide the student with skills of designing long span structures by considering integrated construction and service systems. Different examples of structural systems from various environments have presented to the students in which they can see the effect of such designs on the **environment**.	*	*	*	**B.6.**	• Architecture Program Report for 2014 NAAB addressed B.6 (Comprehensive Design) in the description of this course in EMU university.(EMU APR Report) • Students acclaimed **all of the aspects** are expected to consider in their design process.(Student questionnaire) • The related instructors stated that there are **three aspects** of sustainability in the course content.(Interview)	*	*	*

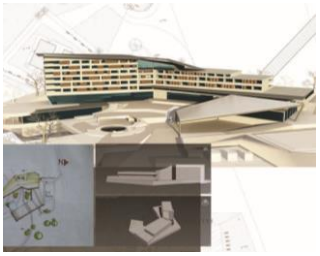
			236 ARCH 244 ARCH 246 ARCH 252										
7	**ARCH 449**	ECOMONIC AND MANAGERAL ISSUES IN ARCHITECTURE		Construction management, principles of **engineering economy**, cost/benefit analysis, break-even analysis, interest calculations, and **economic** comparison; parties and stages of construction projects, engineering site organization, construction contracts and their documents	*	*	*		• Students asserted that Arch449 has **economic** sustainability in the course content. "The course is useful in calculating construction costs in architectural designs"(Student questionnaire). • The related instructors emphasized that there are **economic** aspect of sustainability in the course content.(Interview)		*	
8	**ARCH 492**	ARCHITECTURE GRADUATION PROJECT	ARCH 491	The final project deals with wide variety of architectural and design issues from macro to micro scales, with special emphasis placed upon individual approaches and professional standards.(Course Descriptions) One aims of the course is to develop students' ability further about building and **environment** relationship. The relationship between design and climatic problems are highlighted in the juries. (EMU APR Report)	*	*	*	**B.6**	• Architecture Program Report for 2014 NAAB addressed B.6 (Comprehensive Design) in the description of this course in EMU university.(EMU APR Report) • Students stated **three aspects** of sustainability have role through the students' design process. However, enough attention has not been paid in applying sustainable consideration in the proposals.(Student questionnaire) • The related instructors asserted that there is **environment, social and economic** aspects of sustainability in the course content, but the environment relationship is the more than other aspects.(Interview)	*	*	*
8	**ARCH 416**	PROFESSIONAL ISSUES IN ARCHITECTURE		Professional practice and management issues guide the students through the process of taking an architectural commission from initial meetings with the client through to completion of the project. Based on the description of this course in EMU University, analysis and preparation of accurate estimates of probable **construction costs** with emphasis on construction and finishes, writing specifications, the bidding process, contracts and letters of agreement and the preparation of bid documents will be addressed.	*	*	*		• Students acclaimed this course have explanation about **economic** sustainability briefly.(Student questionnaire) • The related instructors asserted that there is **economic** aspect of sustainability in the course content.(Interview)		*	

4.5 Direct Observation Results

Direct observation happened in the final submission on the fall semester 2015-2016 at the chosen case study (EMU architecture faculty) from six ARCH design studios (209, 292, 391, 392, 491, and 492). In this section, some sample comments came together from the jury members based on each design studios (Table 6). The objective of this observation was to find out the sustainability comments by the jury members from random seven projects in each design studios.

Table 6: The most related final jury comments about sustainability on the fall semester 2015-2016 (Author).

Design Studios	Most Related Comments to Sustainability from Jury	Sample of student's model in 2014-2015, 2015- 2016
ARCH 291	.Emphasis on the overall architectural design process including site .Mentioning to lack of enough windows in backside .Mentioning to Natural light .Social factors same as semi-open spaces .Attention to aesthetic and the mean of form .Sun direction	 Source: Year book 2014 - 2015
ARCH 292	.Emphasis on site and the environment .Sloped topography .Orientation and position .Social factors .Design by attention to local environment .Size of the rooms (economy) .The building should be match with nature(form problem) .The connection path should be logical, using too many stairs is not suitable (can be economical aspect)	 Taken by author 2016
ARCH 391	.Attention paid on achieving unity within the urban environment .Attention to designing in historic area (the building should have differences from other existence building) .Quality of design in social factors, for example; quality and hierarchy of open and semi-open spaces, public-private	 Taken by author 2016

	interface .Landscaping .Orientation and organization of buildings on site .Climatic considerations	
ARCH 392	.Landscape and site planning .Potential for sharing outdoor activity(social activity) .Air quality .Life safety .Using natural light .Matching the topography with the building	 Source: Year book 2014 - 2015
ARCH 491	.Mostly structure comment, not much related to sustainability .Designing by regards to sun direction (south side…) .Using less column, not more than one safe structure(economy) .Economic sustainability by structure	 Taken by author 2016
ARCH 492	.They do what they learned in these years .Circulation .Semi public .Continuity .Attention on entrance .More landscape and green between buildings .Relation with nature .Changing the structure for using less space and having better function(economy)	 Source: Year book 2014 - 2015

4.6 Discussion of the Findings

In-depth interviews, student's questionnaires, analyzing the curriculum and studying common and general concerns during jury sessions of design studios at department of architecture at EMU can provide a reliable source to evaluate level of incorporation of sustainability theme in whole educational program (studio and non-studio courses) at EMU; for further recommendations to be used by schools with same range of concern.

General findings reveal that there are loads of interests about the sustainability among students and tutors are highly concerned with sustainability issues. The shared results in findings section has demonstrated that aspects of sustainable design are currently being integrated in most of studio and non-studio courses, in different extent.

Figure 15 indicates student's and tutor's opinion about current incorporation of sustainability issue in named courses. Results are revealing some inconsistency and miss-match among these two main actors' perception. Courses such as ARCH225, ARCH190, ARCH226, ARCH290, and ARCH390 are such course.

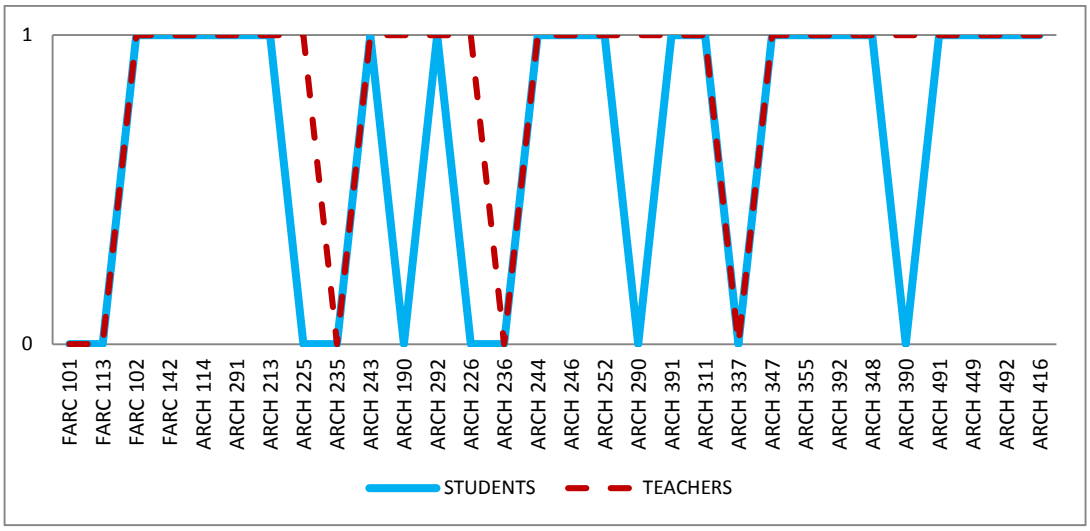


Figure 15:Incorporation of sustainability issue in named courses at selected case study by students and tutors of relevant course (Spring 2015-2016)

To find out about the reason of this inconsistency and figure out any cause of concern in those aforementioned courses or either other courses, Figure 16 developed.

As Figure 16 reveals courses such as FARC102, FARC142, ARCH225, ARCH190, ARCH226, ARCH290, ARCH390 are in critical situation. The common inconsistency happens mostly when course description doesn't contain relevant issues about sustainability, however teachers acknowledge about incorporation. Surprisingly 2 new found courses would be added to the cause of concern course list. Therefore critical courses updated list would be ARCH102, ARCH142, ARCH225, ARCH190, ARCH226, ARCH290, and ARCH390.

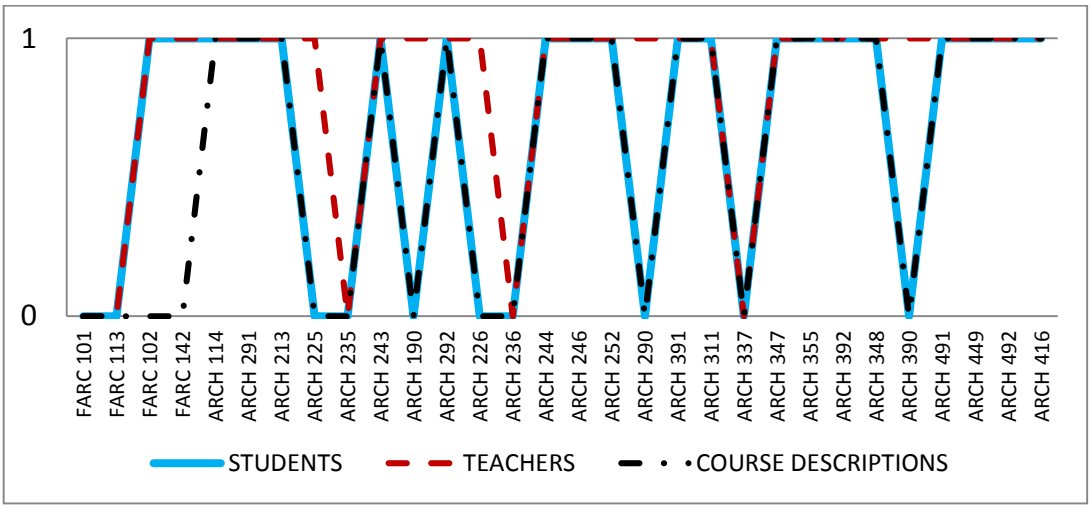


Figure 16: Incorporation of sustainability issue in named courses at selected case study by students and tutors and course description (Spring 2015-2016)

According to EMU APR report (2014), Arch213, Arch 243, Arch 244, Arch 246, Arch 347, Arch 392, Arch 348, Arch 491, and Arch 492 have sustainability conditions and realms, which are already, met by course description. However there are few courses which are not indicated in APR but course description confirms the incorporation. Courses such as Arch114, Arch 291, Arch 292, Arch 252, Arch 391, Arch 311, Arch 355, Arch 449, and Arch416 are such courses (Figure 17).

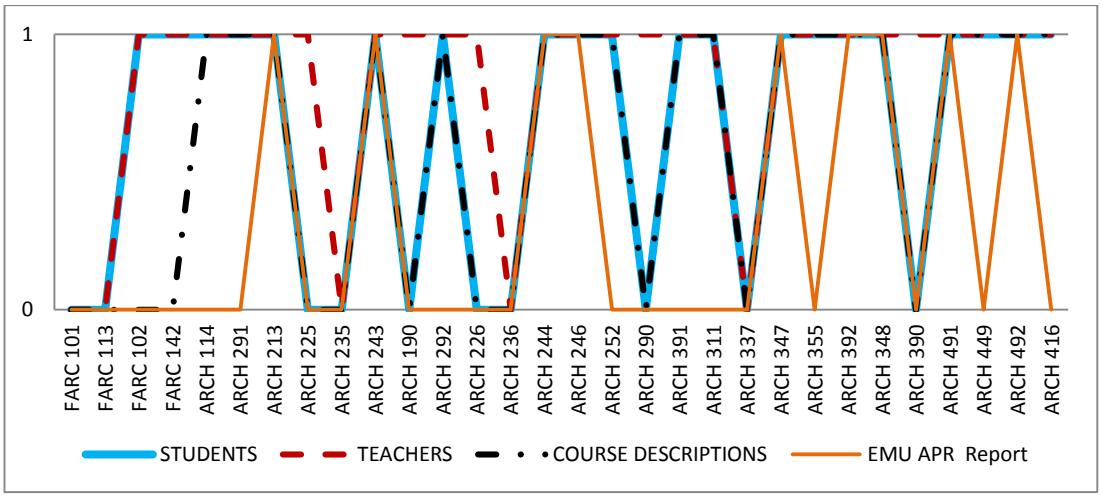


Figure 17: Incorporation of Sustainability issue in named courses at selected case study by means of all studied key determinants (Spring 2015-2016)

Courses such as ARCH102 and ARCH 142 which are not confirmed by APR about having incorporation in terms of sustainability are special cases due to tutors and students affirmation on having proper level of incorporation. Studies revealed that since the main goal and objective of these courses are other issues, sustainability theme is already considered and discussed a lot while it is not expected to be reported in NAAB. Therefore the updated list of critical course would be limited to ARCH225, ARCH190, ARCH226, ARCH290, and ARCH390.

Figure 18 tracks sustainability issue incorporation in horizontal and vertical course relations throughout the whole program (Spring 2015-2016) with the focus of pre-requisite courses. The objective of this Figure is to find out the supportive pre-requisite theoretical courses regarding sustainability.

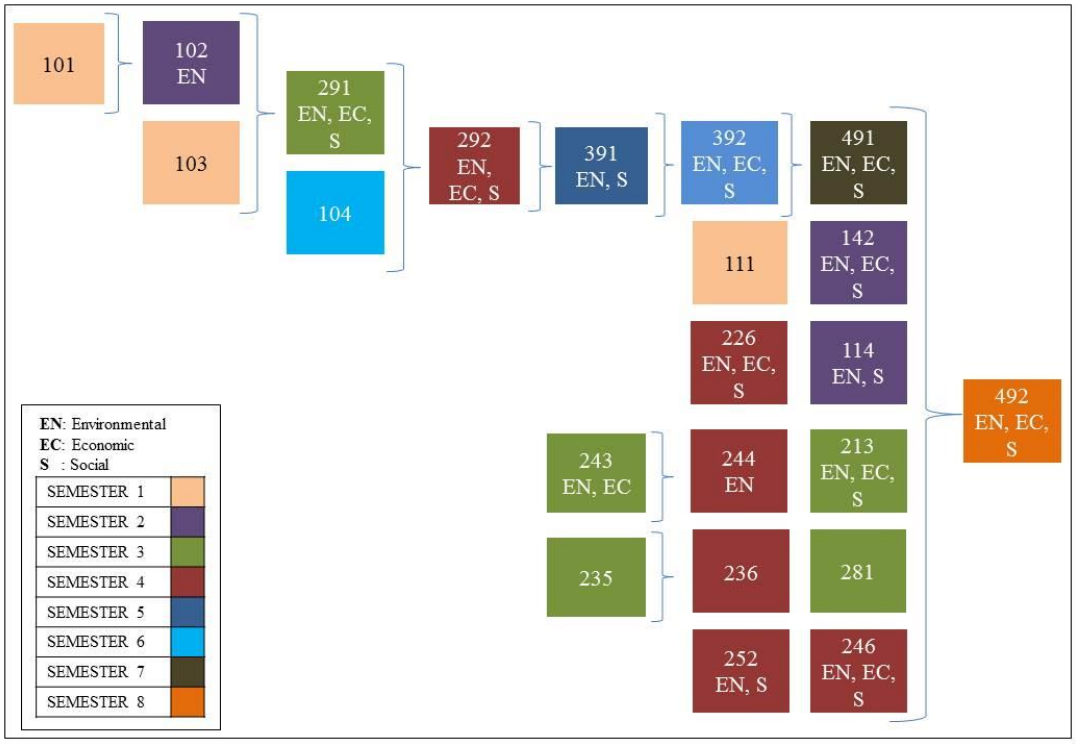


Figure 18: Track of sustainability issue incorporation in horizontal and vertical course relations throughout the whole program (Spring 2015-2016) (Author)

As it is shown in the Figure 18 seems, design studios known as Arch 291, Arch292, Arch 391, Arch 392 and Arch 491 are not supported by any prerequisite course with sustainability theme; which would not be negative if other offered courses in same semester to regular students support them. In this regard, the Table 7 tracks sustainability issue incorporation in horizontal course relations throughout the whole program (Spring 2015-2016) at EMU. As it is revealed studios are getting proper support by other courses in same semester to support required sustainability aspect to be followed by student.

Table 7: Track of sustainability issue incorporation in horizontal course relations throughout the whole program (Spring 2015-2016) (Author)

Semester	**Sustainability in the Courses, Department of Architecture, EMU**						**Covered Sustainability Aspects in each Semester**
2	FARC 102 **EN**	FARC 142 **EN, EC,S**	ARCH 114 **EN, S**				Environment Economic Social
3	ARCH 291 **EN, EC,S**	ARCH 213 **EN, EC, S**	ARCH 225 **EN, EC, S**	ARCH 243 **EN, EC**	ARCH 190 **EN**		Environment Economic Social
4	ARCH 292 **EN, EC, S**	ARCH 226 **EN, EC, S**	ARCH 244 **EN**	ARCH 246 **EN, EC, S**	ARCH 252 **EN, S**	ARCH 290 **EN**	Environment Economic Social
5	ARCH 391 **EN, S**	ARCH 311 **EN, EC, S**	ARCH 347 **EN, EC**	ARCH 355 **EN**			Environment Economic Social
6	ARCH 392 **EN, EC, S**	ARCH 348 **EN, EC, S**	ARCH 390 **EN**				Environment Economic Social
7	ARCH 491 **EN, EC, S**	ARCH 449 **EC**					Environment Economic Social
8	ARCH 492 **EN, EC, S**	ARCH 416 **EC**					Environment Economic Social

Moreover it could be perceived that almost all sustainability issues are covered by courses from second semester of architecture education at EMU in different levels. Throughout direct observation taken place during this study it was realized that all jury members are commenting and following students' general and detailed architectural decision in terms of sustainability. This track by them is taking place according to students' level starting from awareness in early semesters to comprehensive level by graduation time. As Figure 19 indicated awareness about sustainability issue takes place in second semester of first year, understanding level in second year semesters (most of bars are showing maximum level of integration) and after that although level of integrity seems decreased however usage of learned issues will reach to the pick which could be known as comprehensive.

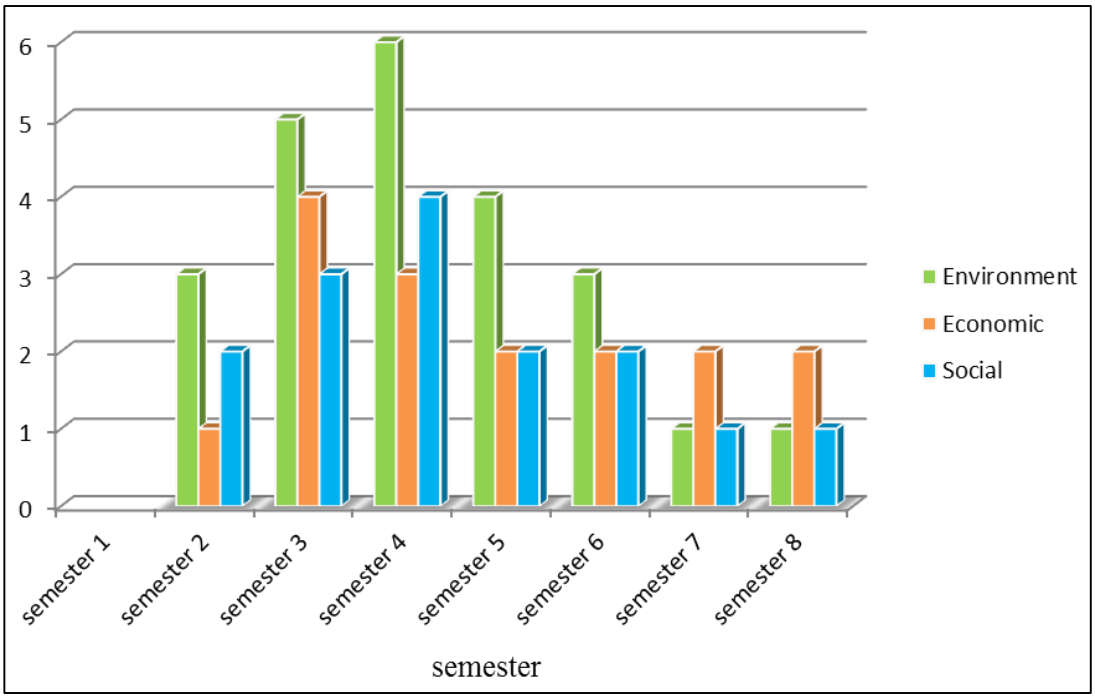


Figure 19: Track of sustainability issue incorporation in different semesters throughout the whole program of Architecture program (Author)

On the other hand it is realized that rarely before the last two semesters, jury members are commenting on economical sustainability. In general it could be

perceived that EMU architecture program is promising to the need of incorporating sustainability issue in curriculum. However still there are some courses such as ARCH225, ARCH190, ARCH226, ARCH290, and ARCH390 that are needed to be re-discussed.

Lack of proper usage of history and theory courses and minimum incorporation of such theme in summer practice courses are quite visible and needs special treatment. This is common problem for many schools in the world, therefore recommendation to support this problem would be supportive to large group and not limited to EMU.

4.7 Summary of the Chapter

This chapter tried to discover the level of incorporation of sustainability in EMU architecture education. Initially, the obtained result from the in-depth instructor's interviews has been discussed. Next, the questionnaire part discussed the finding from questionnaires based on the five main aspects such as the external and internal aspects, the curriculum, the education location, and the evaluation procedure. Then, analyzing the curriculum in the department of architecture attempted to analyses EMU architecture curriculum regarding the incorporation of sustainability by the aid of interview and questionnaire result, EMU APR report in 2014 and the course description. The objective was to find out the level of integration of sustainability theme in the architecture curriculum. Direct observation attempted to find out the common and general concerns during jury sessions by the jury comments. Finally, the discussion on findings tracked loads of sustainability in the EMU architecture education.

Chapter 5

RECOMMENDATIONS AND CONCLUSION

5.1 Recommendations

This study found that current architecture education program at EMU is promising to the need of incorporating sustainability issue in the curriculum. However always there is a need for improvement and progress.

The following recommendations are based on found results from EMU case which could be used by other interested schools of architecture which are sharing same concerns with EMU and are looking for ways to improve their program; and Department of Architecture at EMU itself.

a. Incorporation of sustainability issues in architectural education could be more simply achieved through last semesters of education; however this research found it more efficient if it start to be introduced to students since first year. Definitely the level of integration relatively would be low. It could be started with awareness in first year (Second semester as found positive in case study) and change to understanding in further two or three semesters and comprehensive in last semester.
b. Start of sustainability integration wouldn't be taken place only in design projects solely. Prerequisite courses and courses offering in similar semesters should support this aim and integration level.

c. Core courses are the main feeding source to any educational program. However, elective courses could be very much supportive to the students to be well-prepared for their future career and professional life. Therefore offering a wider range of elective courses (Seminar, Training, programs etc.) which are following and supporting dependent points of the program and curriculum.

d. Non-technological courses should be incorporated with more sustainability content such as the cultural, economic, social and environmental issues of sustainability.

e. Proper co-relation and coordination between courses are all the time a cause of concern. This situation is more difficult when this inter-relation needs to be happening between history courses and design studios, construction courses or others. Common researches for these courses, trip to visit real sites and projects could balance the inter-relations and shorten the gap. Such assignment types can increase students' self-criticism and critical thinking faculties. It might be beneficial as well to history and theory professors of the department to visit studios (According to type of the projects given to the students the studios would be picked) in intervals and have a speech or panel discussion on students' project in intervals.

f. One important factor that leads students to learn sustainability is active education. A fundamental aim of an active educating curriculum is to provide students the ability to use the new information in real life. It can encourage students to grapple with various ways of looking at problems, think creativity and help deeper with issues that are complicated and multi-faceted. The summer practice courses are very effective in activating architectural

programs. The summer practice courses should organize more sustainability literacy training contents to increase the awareness about sustainability aspects. Technical trips/workshops experience, construction site and office experiences are providing proper engagement of students in real profession, however there should be a well-defined expectation from students in terms of sustainability considerations, analysis, implementation or either criticism.

g. Alignment of sustainability integration with defined evaluation criteria especially in jury sessions as grading days are very important. External / guest jury members should be introduced in advance about students sustainability awareness and majority and minority of focus on specific aspect of it (Social/Economical/Environmental) and considers it as grading criteria.

5.2 Conclusion

Nobody can deny the importance of education in the prosperity of one society. By looking at history, it could be perceived that the prosperity of human and life has a direct relation to the quality of education and learning. An appropriate education achieves a number of essential functions such as training of men and women who will become future leaders and decision makers. Besides, education prepares the scientists, experts, engineers, and architects in order to improve new devices, technologies, and etc. Education has a powerful doer of social alteration; it increases awareness and knowledge of new progress. It can help to preserve the nature, improving knowledge and technology, removing the old and wrong traditions and providing the equal opportunity between humans.

Sustainability is a recent concern in architectural educations in respect to the global needs. And it would be naive to expect newly graduate architects acquire the relevant needed information and knowledge of this topic by only attending in seminars, workshops, conferences and the like.

Curriculum as the core of architectural education contains plans, objectives, teaching method and content that are used to steer the educational activities to attain certain educational aims. Architectural education and architectural curriculum are affected by many developments or changes that happen around the world during the history. Curriculum, the background of educators themselves; and the integration in their teaching, horizontal and vertical course relations throughout the whole program are critical parts needs to be put under scrutiny. In addition, the design studios and the given projects in each semester are other important keys since design project provides students the possibility to deal with the content of their studios and theoretical courses. In this regard, this research attempts to find appropriate recommendations for better incorporation and implementation of sustainability theme in architecture education.

The thesis has demonstrated that aspects of sustainable design are currently being integrated into EMU architecture program (undergraduate) in changing level from the first year to graduation level in the content of each theory course and as used design strategies at studios. This involvement starts from the second semester of the first year in awareness level and reached the peak with full coverage of all aspect (comprehensive) in last semester. Moreover, tutors tend to integrate sustainability into their teaching out of their own initiative without having it clearly spelled out in the curriculum (many examples were discussed in discussion part).

As discussed in literature chapter, Rosenman and Bilello (2002) argued that sustainability must be placed in the core of the design studio and the nature of the studio and sustainable design is one of connection. Usage of natural ventilation and lightning, emphasize of passive heating and cooling, daylight and shadings, preservation of natural elements on site (trees, slopes)" are clearly practiced in design studios in various extents.

The work concludes with some recommendations for better-incorporating sustainability contents for all architectural education programs.

5.3 Future Work

Architecture education always was aware of its influences on cultural constructs. Being reflective to the changes in the landscape of profession, taking environmental themes into consideration are some of those examples.

However, since inclusion of diverse themes and reaching to multi-faced objectives operationally and institutionally were found complex. There are few conscious and interested departments and schools of architecture who are willing and trying to explore ways to provide holistic and substantial information and practical knowledge for their students.

This study revisited the used methods in courses and the holistic approach of the program both to provide promising opportunities for most proper level of integration of sustainability theme within architecture education. Areas for further researches would be exploring possibilities of profession integration into architectural education in both scales of macro and micro.

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APPENDICES

Appendix A: Interview Questions and Transcription

a. the Cover Letter to Instructors for Interview Appointment

Dear professor

Greetings

My name is SOHEIL GHADERİ and I am working on my Master thesis focusing on the integration of sustainability themes in accredited architectural education.

This is a study involving in-depth interviews with a number of faculty members to better understand their views and experiences involving sustainability within architectural education.

From your CV, we believe that you are interested in the topic and hope you would be willing to spend a few minutes with me discussing the issue.

First - would you be willing to participate in my study as an anonymous participant?

If so, I wonder about your schedule in April or May.

I anticipate the interview being approximately 20 minutes depending on your thoughts and the general flow of the discussion.

I appreciate your time and look forward hearing from you at your earliest convenience.

Thanks so much again for your time.

Sincerely yours.

Soheil Ghaderi

Email: ghaderi.arc@gmail.com

Hand Phone: 0533 8449186

b: Transcription of Interviews

1. Prof.Dr.Yonca Hurol:

I don't work on sustainability but I'm trying to follow myself and try to develop an idea about it and I know it effects everybody, so, I'll try to answer your questions.

1. How do you perceive the integration of sustainability into an architectural curricula?

as far as I can see, we have some courses on sustainability, I think we have one of the must courses is related to sustainability, directly I mean, and we have some elective courses, as well, so, we are somehow related and it should be related But, I believe every courses should somehow relate itself to the issue to sustainability. Including my courses as well.

2. How do you feel sustainability is best incorporated into architectural curriculum and courses?

I haven't heard people discussing about this subject before and I haven't read directly about your question but I think sustainability is generally an approach, new approach to world's capitalism. Example: It effects everything, so I believe that in all courses we should think about sustainability, for example I'm teaching structures, for example what is the sustainability in using the steel structure or concrete structure. I have to consider this type of issues, not yet I haven't started yet but I am aware of the situation, and I also believe that university education itself in for each department should also be sustainable, that's another issue. What we are teaching to students should be sustainable.

3. What courses do you feel best allow for the integration? What courses don't?

I think when we here consider sustainability it directly remind us the courses are about climate actually, when we think about sustainability and architecture, as I said before, I believe, that all courses can relate themselves to sustainability even the history courses because, we are dealing with conservation and those type of issues, we should think about sustainability in all of courses.

4. What projects do you feel work/don't work?

(research base and design base) All of them I think, All of them if this issue is within the mission of university and with the mission of the department, and faculty then I think the all courses and the all possible ways ,it can be studied there can be project, design project, there can be research project towards this, anything.

5. Why do you feel this approach is best? How do you know it is successful?

Yeah, if we evaluate our success by sending questioner to our graduates and we sent the questioner to our graduate , if they said that , they have been educated here in the good way above sustainability that would be a good indicated for us.

6. How do you feel the type of university structure might impact the integration of sustainability into architectural curriculum?

Mission of university, if sustainability takes place in the mission of the university, than it effects all of us.

7. What do you think about the conversations surrounding sustainability and green building within architectural education? Are there important connotations and terminologies in play?

What I have heard from my colleague some of them prefer to use ecological architecture, some of them use sustainability some of use green architecture, so , I don't know the main differences between them but , I think it is causing a little bit confusion, eh, it should be make more clear I believe. I don't know the subject that much to discuss these issues , but I use the word sustainability in myself, I use green architecture mostly for if greening is integrated to architecture I use green architecture but I might be wrong, ecological architecture, I think is quite similar to sustainable architecture. I don't know this subject that much.

8. What role do you feel architects play in the realm of sustainability? (Advocates, leaders, facilitators, experts, specialists, etc.)

We can be experts, let say specialist, we can be advocates, but, leaders I believed is more related to economic in the production industry.

9. What have been your experiences with the integration of sustainability into courses and curriculum?

I have seen some courses edit to the curriculum, elective courses and must courses, and I have also, seen about my course, in Harvard university, the structure courses, contain information about sustainability, I said that I should do the same thing, it's a good action I believe.

10. What elements do you feel are most necessary to be successful?

I think in the university to be successful, it should take in the mission of university. If it is in the mission of university, then I think, it will effect in the mission of faculties, mission of departments, it will all effect everybody I think.

11. What do you feel is most important?

It is the ethical approach, ethical feeling towards the world and towards all the materials or everything around the world, then, I think you will tend to behavior more sustainable way, I think that's the most important feeling.

12. What types of conversations do you feel are necessary to have regarding sustainability and green building – both in the classroom and with faculty?

Again, if it takes place in the mission of university in the mission of faculty and in the mission of department then it will be entering to everywhere. once after 1909 earthquake, I saw some. I had an experience in middle east technical university, the dean of the faculty said that this year will be dedicated for earthquake problems, so, all courses is in my faculty to relate themselves somehow to earth quick problems and safety of people and they all courses reply to this say that, they are going to do this in this term, something like that, might be good initiate I think. If dean of the faculty causes everybody within the faculty, to dedicate this year for sustainability, I think that would be much affected. It might help your research as well, because, than you can see everybody can do.

13. Who needs to be around the table for these conversations? How do we get these people around the table within courses?

Actually if dean will do something like this, then it will be the announce to whole of faculty and in each department it will be discuss and it will be accepted

14. When do we introduce interdisciplinary themes? How much do we introduce?

Actually, architecture is the interesting area, because, our courses are very diverse and all of them relate to different subjects. For example, when we talk about structures, we are related to structure engineering when we think about acoustic there is a profession work, acoustic engineering or when you think about climatic issues, mechanical engineering is dealing with these type of things , so I believed if we also know what is being done in civil engineering for example, for me as a structure teacher, if I know, what have been done in civil engineering department to word sustainability structure engineering courses that will effect it. We should know what everybody is doing, At the moment, there is little relationship, only in the graduation level, we invite these people to come and see our student projects, but it's not about sustainability, we just us there opinion about the projects around their own subjects.

15. What do you personally feel are the biggest barriers to sustainability being a constant theme in architectural education?

Again I believed the bases of this is ethical feeling, So, if most of the people do not have that feeling and if it is, introduce as a kind of fashion, so, everyone to want follow the fashion, so, they follow it, but if they don't feel it really, it will just spark and it will be finish very soon. So, the basics of this, is the feeling, And if it can effect, we should not presenting as a kind of fashion, we should make people understand the ethical feeling behind it, and it will be more stable

16. How do you feel that sustainability is incorporated into the NAAB Accreditation requirements?

I think one of the requirement, one of the criteria is related to sustainability, and as I read this question, I know there is a relationship , I couldn't turn back to criteria to check what was the relationship but as far as I remember one of the criteria is

related to sustainability and it has to be fulfilled by the department and also there is five perspective which has to be satisfied, one of the perspective also related to sustainability as far as I know, so from both ways, they are asking for it .Yeah, it's kind of related.

2. Assoc.Prof.Dr S.Müjdem Vural

1. How do you perceive the integration of sustainability into architectural curricula? Very very big field of research. It's very big umbrella and people are usually lost the sustainability what we call the sustainability. It has three major things: social sustainably, environmental sustainability and economical sustainability. As architecture curriculum, we are more in the environmental part, but we should deal also thinking about the economical part and social part. Because, as architects we are creating the build environment which is effect the, social sustainability we have to let the social needs of the users be continue, we have to think about the economy of sustainability. It's a mass of the boil which all related with each other and nobody could really give a good clear definition of what is a sustainability. Architecture curriculum was actually thinking about it because what architecture curriculum try to teach students is to fulfill the needs of the users. This was from the before. There was even knows universities that you are designing something because of the user, because of person, and what is the need of that person. So, we were actually beforehand thinking about sustainability without knowing the vocabulary of sustainability. So integration was all the time there, maybe at the 30 years. Also, in the architectural curriculum things have been changing and now we are going backwards to find the integration of sustainability, because since the technology went very high we keep taking that track and get loss of sustainability issues which was not called the sustainability. I think there has been

always from the beginning of the time this integration for example Vetrious is in before cries in Rome. Ten books of architecture by Vetrious and he was mentioning things, he was not calling sustainability but he was mentioning what was there was already sustainability, so it was very old. There has been all the time even there was not the vocabulary.

2. How do you feel sustainability is best incorporated into architectural curriculum and courses?

It should be emphasis maybe not like sustainability but the needs from like why we are designing, if we can really see why we are designing we would be keeping track of sustainability. So, the best way in incorporation architecture curriculum is basically the design studios. Because those are the ones that we are designing and the technical course we say the architectural education is which created by designs studio. And other courses are feeding that spine, but the spine is architecture design studio, so I think incorporation is mostly should be given in the design studios for sustainability.

3. What courses do you feel best allow for the integration? What courses don't?

We should be integrating hundred present to the design studios, some theatrical course also, but for example, history of architecture, or drawing, or drawing technique cannot be too much related with sustainability.

4. What projects do you feel work/don't work?

It should be everywhere because I am keeping the idea of if we are designing something we should think in the needs and sustainability is one of the needs.Social sustainable, economical and environmental. When you are designing for competition

you have to think about sustainability and your project has to be pushing on that method or design base also, research base. Everybody right now researching about sustainability. It should be working with everything.

5. Why do you feel this approach is best? How do you know it is successful?

It is actually is like now people are discussing, why we are discussing the sustainability, it is like the boat is sinking, and we are trying to escape from the boat but we have to catch the boat first, now we are talking about the boat, let the boat go away. Let the sustainability go. We should thinking about how to solve this. Actually, I being about shall we be the once who are talking about sustainability in Harvard, in greening building United States, these are the arguments that they are doing right now. Now they had been working on sustainability for so long and we started as a let say developing countries maybe ten years, fifteen years, earlier, now they are finishing the topic. I cannot really answer this question in the way that will help you.

6. How do you feel the type of university structure might impact the integration of sustainability into architectural curriculum?

I am usually giving this question exam to my students, I think, if you are going to have a tailor made custom, you will go to the person and you are in the first appointment you see him or her and you will check what he is wearing. Accordingly, you will decide can he make a dress for me or not. It is exactly the same way for architect. So when you go applying, the client, looks at you , the way of speech, the way of siting, how you are dressed, and everything and it get affected, they are saying can he imagine the place that I will be living it. So, they are checking. It is the same, so I look at the university structure, is the rectorate acts, accordingly

sustainable when you look at the campus, or how they manage the financial issues or how they manage the faculty of students, so this should be not a way, not the goal to reach but, it should be a pass to walk on (work on). so if they act accordingly, then I will not suggest that, there would be any kind of impact, because the politic that they are using should be sustainable, in three issues, your questioner is mostly talking about, the environmental sustainability but, university administrates should be check the economical sustainability then the social sustainability and then the environmental sustainability, so, it should be a pass, that the university should be walking on (working on)

7. What do you think about the conversations surrounding sustainability and green building within architectural education? Are there important connotations and terminologies in play?

This is not only green building or sustainability, I told you everybody is using these vocabulary and we don't really know what the vocabulary is that by the way right now I am only talking about my point of view, what I read from, what is going on. So, The terminologies all mixed up with everybody, and it's an ocean, we may say that nobody is really certain about the terminologies and we are not really hundred present efficient of conversation that we are talking architectural education because when you are talk about sustainability to our student in one course, you may neglect some of the part, but in another course those part could be involved them. If you are trying to move these people to our new settlement with zero energy they will lose their culture then social ing so, that doesn't work , so, I don't think that everything is covering. it's very complicated questions, it means, Myself cannot say that the conversation talk in architectural education is enough and terminologies are enough

and everybody talking about, ok , that we can understand each other , I'm not hundred present sure about it.

8. What role do you feel architects play in the realm of sustainability? (Advocates, leaders, facilitators, experts, specialists, etc.)

Because we are in the stage of designing, we are in everything, so, we should be the leaders, we should be the experts, specialist, we can be any part of here, because, we are the team work, architects are working with other professions areas for example we are working with civil engineers, mechanical engineers, and physics and so far, building physic. because what each of us doing something in our mind that we dream and become realize, so ,we as the architects, could be acting in any of these rolls and we should acting in any of these roles .

9. What have been your experiences with the integration of sustainability into courses and curriculum?

Because my topics are related with sustainability a little bit. I tried to emphasize it in my courses in anywhere in my design studio, in my construction course, or in my masters. We are pushing actually in here and turkey, more curses related with sustainability. But they are usually elective courses. Because the curriculum is the set, and to change the curriculum it takes too much too long time, And there has been curriculum changes all the way, but it is a one year or two years of the process, so, it is really how to change the curriculum by your idea because there are too many inputs in the curriculum, You have to fulfill the requirement of the America, so, it's not only sustainability, but in these for example, in united states, or in Europe you have to fulfill sustainability issue too. For electives you don't have to change the

curriculum, so, this is the richness of architecture's curriculum education. That is the reason it is usually the electives.

10. What elements do you feel are most necessary to be successful?

You have to act, If I say to students, you should not to be smoking. Than the student sees me in the café I am smoking, will he trust me? No. So, I should be as personality, person should be acting sustainability for it to be successful. for students to believe it, so, I can talk it in one class about sustainability and then I can act in a totally different manner , that will not be successful, me giving the knowledge to student about sustainability , I could talk for hours, but if I don't act like it, doesn't work. Remember, I was giving you the attendance paper, and they said what is this? One of the classmate. I am using the back and I said this, because we don't have enough resources to spend. This is one small example.

11. What do you feel is most important?

To think about the human and human needs. It is not you and me only, it is all around the world. Half of the world doesn't have clean water. And our flash water, I mean what we have in the toilet, clean one in the toilet, is the drinking water of half of the world. So, this is the first thing, if we think about people, and if we want them live well healthy then we will be solving the issues. It is really related with sustainability for example if I taking three showers per day, if I spending that much of the water, so, what do I do talk about sustainability?

12. What types of conversations do you feel are necessary to have regarding sustainability and green building – both in the classroom and with faculty?

I don’t really how to answer, repeating that I rather than talking, rather than conservation, we should be acting. So this is the main thing that it should be.

13. Who needs to be around the table for these conversations? How do we get these people around the table within courses?

Actually, the conservation table is very big, when you look it in the widest. There has to be politics, there has to be economic people. There has to be administrate. There has to be exporters talking about this to come in conclusion, because, me, having scientific world, does not mean that we will be successful in sustainability. If they don’t let me design and act, how am I solve, who is going to let me design? The administrators. And what is it how I design it mean according to rules and regulations .who is doing roles and recreations? The politics. So, they should be all there. It is not related with education actually and courses, this is my point of view.

14. When do we introduce interdisciplinary themes? How much do we introduce?

Sustainability is all about interdisciplinary, it’s not only architects or designers at all. It has to be a very big thing as I mentioned to you before.

15. What do you personally feel are the biggest barriers to sustainability being a constant theme in architectural education?

Architectural education is a very wide education, and it’s not for 4 years of education. You cannot finish the architecture in 4 years. One of my professors was all the time saying, we can giving you only 20 % of architecture during in your education. The rest you have to fulfill your self.so, this is the biggest barrier I think, because, we are trying to give too much information, too much knowledge to the

students, and it is only one of them that we are trying to give them sustainability . So if you try for example, if you are 32 criteria and one of them sustainability, this the biggest barrier that you are taking sustainability one over 32 which is not.

16. How do you feel that sustainability is incorporated into the NAAB Accreditation requirements?

You have to fulfill, realm A, B, C. A is more about design. B is more integrated building and C is more rules and regulation how the relation with the users. In these three, realms, there are 32 items and one of them sustainability. I think this the B 2.you start with A1 A2, and you go to A10 or A9 , I don't remember the number, 9 of the in the A realm in B realm I think you have 11 or 12, so , you have those items, and see you have 8 or so. for example, A 1 is design thinking than B 6 is a comprehensive design and B 8 or B9 is sustainability, I don't remember, so it is, I said one of the criteria, you have to fulfil, so it's not the main issue. At the end, so, I don't know what you are going to come up with the result from my answers but I think it's a very broad topic. That it should be as I told you , when there was not the vocabulary, sustainability was in the early times when we are designing actually we were designing according to sustainability, all the design criteria is were according to that . Now you may see many works try to say the vernacular architecture or the historical settlement. where is sustainable in those days and now they are trying to welcome them and take the sustainable criteria and try to adapt them nowadays design, so , it was , there before, we forget it when we working so fast.This is how I feel about sustainability.

3. Asst.Prof.Dr Pınar Uluçay

1. How do you perceive the integration of sustainability into architectural curricula?

I have graduated in 1993from school UK , and sustainability was integrated to Architecture design studio although it was not directly in but from two decade home works most of European school has done a lot of integrated sustainability in to the architecture curriculum , I mean they have very courses starting from role of studios where the basically word with earth and other alternative materials. I think in many of theatrical courses as well, you can find a lot of courses. Is it easy to make change curriculum , I don't think it is , from experiences from our faculty , and you are there, it is not very easy job but again here at emu , a lot of development been having work there 10 years ago and coming back to the 10 years , and 15 years, its different. I mean, at start yes, I remember Shabnam hoja had a course related to sustainability but I think thesis or somehow. With such issues, so yeah, individual course in the beginning part or only offering of sustainability is in different courses.

But of course now days, there is larger amount, for these courses to be integrated, and so we have recourse. We have ecologies issues in architecture, some other energy efficiency courses both under graduate and graduate now, so that's the development, I mean it is happening here; it is all of the roles.

2. How do you feel sustainability is best incorporated into architectural curriculum and courses?

Now we have theoretical courses but I think it's not well integrated into architecture design studio and I don't know if you know we are going to NAAB accreditation process. and there obviously observation related to our because they actually made the investigation of what we are teaching and how we are teaching, so they are interesting because we are suggesting that yes, we do have we are teaching very

extensive issues of sustainability in the courses, but somehow they are not integrated in architecture design studio, so, I think that is our problem. If we manage to do this they that would be quite successful. yes even like international design week which we are try run , recently for five years, and make them , but actually , it's going more works this years in green gesture, so we are trying to emphasizes , so students can learn more by learning and doing. Example: They have produced earth wall, it's an alternative construction technique. last year Santiago come from London university, they work with pallets , built up , and constructed this semi space here, so we are try our best, but of course when we come to making , nothing is the best way in the learn of sustainability issues, you can also learn about sustainability in the design studios as well, it is extensive and it is difficult, of course for school to integrate practical and workshop change in curriculums but as far as there are courses that I concern, yes of course I mean , it is being since 1980 the issues that now everybody talk and everybody knows what about, so , I think more or less, it is, in all be architectural school curriculum now as well as ours , so it can be done , this course is easier , because our changes come demand of other accreditation processes , they also demanded , so , more and more schools in north Cyprus and probably turkey, they wish to go to through the accreditation process this will come with demand that sustainability issues actually occurred as there are courses , so it will be just a matter of time and catch it up each other , so I mean probably, the other school department also has same process and I mean I am coming from Cyprus international university as far as I know similar courses are not there , they are not really teaching , yeah there is passive solar design being there. But not exactly sustainability issues. I think that will be something in other school also, integrate.

3. What courses do you feel best allow for the integration? What courses don't?

If we have to go through vary courses, I think the sustainability is general and holistic look in the life, so, I mean, if we are not school, I think we should collecting waste, and we should know what we have to do with that waste (its general), I know that for example in some of the courses in design studio for 191, because student were going to the printing projects, and a lot of paper in wall in it. What they have done this semester it was next student actually present up to the jury, using lc projector, so, some sort of sustainable thinking. I think sustainable thinking , I mean yes , you are offer as courses and integrated in every course, but it depends on the courses well, I mean, in construction course obviously you have to teach all source of construction system , not just alternative sustainable constructing, but somehow, I think there is a way that can be integrated in every course. there can be integrating in course , but it is theoretical material , as the way of looking at this , I think we should be as academician should be leading towards some change because change comes true , you know having empirical , on more people, I think students are the best tools really, we can change for the better.

4. What projects do you feel work/don't work?

Missing answer

5. Why do you feel this approach is best? How do you know it is successful?

Missing answer

6. How do you feel the type of university structure might impact the integration of sustainability into architectural curriculum?

Well university structures , there are not very flexible, yes , as I said , curriculum change are always is not very easy , we have done curriculum change here, for once or twice over 10 15 years, because it takes a lot of procedure , it has to go , to department of architecture , it can be issues the initiate the action , some change and it goes to other accreditation , it takes of course the process so I mean , yes , de we need more changes? Yes , we need more changes but I think that comes with the as I said university structure unfortunately in the middle east we are still very properties is very high and demanding . it is not very easy to change university structure .but again as I said sustainability for more broader context has to be the university goal is well, I mean it was very easy to rector talk to us to opening , he said to planning build agree building new lecture rooms, and then they have actually ask for the advisor department of architecture which is quite encouraging better things are happening , so that's the development as far as the curriculum is concern , I don't think , the university structure is flexible enough to change, I mean at the moment by our foundation studies is very important ,but we are offering those courses every semester in chart that I said , base on architecture , graphic communication skills, but , in the first year there is hard , any courses related to sustainability , instead you know , they are more general courses like mathematics, English and ... . So I think they are very important for the submission at all , sustainability thinking , so , I mean , why NOT increase the amount of courses that have sustainability they are focused on sustainability issues , but I think, it's not very easy thing in university level because , it depends on so many other things , so many other decision, and higher level decision so something is not that we can control really.

7. What do you think about the conversations surrounding sustainability and green building within architectural education? Are there important connotations and terminologies in play?

The education of instructor are so important, I think ,our job involves taking continually usually, actually, learning ourselves, so of course, it makes a lot of different, the educated teachers than more chance to educated students, so we can say everybody of course in this university , is thinking or is going along in sustainability but again as I said takes time and I mean we are in to much better place than we were years ago, I am hopeful that the change will come, What do you think about the conversations surrounding sustainability and green building within architectural education? Well sometimes, I think it is a lot of bla bla , as well sometimes , and then we somehow driving the way will kind of discussion of sustainability and green building, we know that green building kind of turning to the market in Europe , I mean , because economy, we need new ways of new jobs, so starting from materials going to rating building according to there how green they are some sort of market , yes, its opening opportunity for people to get new jobs in construction sector area, so I think sometimes , it of course little by the market but , people inside, they are relay carrying and want to go to works, be essence of sustainability so I think we really need to think well , accordingly in design speaker who came Santiago, I think it was good a lesson for all of us , because, he was talking about not creation good looking building , creating building cost less, and he was even talking about word sustainability and new different side , everything he was doing, it involves maybe less advantage group like , maybe mentally ill people , teaching about how constructing , using recycle materials he was involve in the children , I mean if you can access, because , architect is not just about architect,

everything about education society, integrated thinking alone , because, yes , taking involves , this and other education doesn't , I mean if you are driving from Famagusta, in salamis road, everywhere is like that , it's very good example of society is being kind of getting away from our losing a way between the culture values and you know and the best in part and you can see this, this building, because, I don't think there is lots of houses that all in different style that is not nothing to do with the past, I think there are very, I mean not only us, but the rule is very much. in the case of Famagusta. I think we have to really be critical about the way we are living , about the way we are pursuing thing, I think that is a lot to with the way how sustainable we are thinking and I think, it's something more general than architecture, and it goes lot to do with it , I think , as architects this new role , we have to see actually architecture as a tool in to the educate people, educate children , make other some advantage group up more active and participate in to everyday life. I think if manage to do that , architecture is kind of changing in means of today's role, in today's kind of life , so if you can do that , because of we are training to do that because architecture education is not conventionalist , thing critic because the design studio conventional thinking is kind of attacked by so many thing, so our education is more centered thinking and finding solution to problem, so , this is the problem of 21 century , so , we have to find ways to deal with it , and leaving architects now, are trying not to see architects as a name, but as a tool , that's help them to comes together in the society , actually share values, remember culture and .., so if we can do this, I think it will be really helpful for our societies.

8. What role do you feel architects play in the realm of sustainability? (Advocates, leaders, facilitators, experts, specialists, etc.)

Yes , as I said , I think everybody is involved and you realize that it is more rigid role issue than only relating to architecture , so because we are change , I think as problem solvers, that put us the head of so many other professions , and I think, architect , I mean, we should first of all stop thinking that we are the only person that can lead everybody , but we should more think intense of our job is tool to create change in the societies , so many countries like America , the architect role is not strong as Europe or Usa , If the project is going to be done, they take their part in the project with media sociologist, psychologist, electrical engineer so , the architect is not so kind of the only the person that has to know everything and that has to lead everything I think architects can take part in different projects and important put maybe some sort of sentences be as a you request another one , I think we have to learn actually, to work with others, yes, in one way we are problem solvers but that capability that it get university also gives us important everything we are only person who can say something or claim something, actually we should to corporate , we should to think with the other, that something challenge, that something come with change the society now. so , architecture is not all about designing , expensive , something sculpture, architecture is about sometimes see away to get people put of economic. So sustainability is a keyword that try to change the role of architect in the society, so that's quite important, and the way how we are work with the others.

9. What have been your experiences with the integration of sustainability into courses and curriculum?

I was lucky, because I have done a master course in ecology design and somehow my research also are involved with the sustainability issues as well, I came here to start work two years ago , I was like absorb for the course , like ecology issues in the architecture, I tried make experience to that course, and then to the student, so my

view of looking at life is in the course particular is trying to teach or create awareness on wider topic as much as possible because you are limited with 14 15 weeks , and of course with the class summer ,so we trying keep students aware of issues discuss around the world now, so at least if have awareness, if we know, what has been discuss then you are able to catch up, you are going to practice, because I think when we are in the practice now, depending we are where going to work , somehow you are going to be deal with sustainability issues.

10. What elements do you feel are most necessary to be successful?

The mission and the vison are important issues, but then again we can put mission and vison as a something to be there as works, but what makes true is of course, if you really follow those mission with your practical daily life, so , I think what really will be happen in number of culture anyway in hells sometimes yeah the words are there , but the practice are much later , we put words there , maybe we follow what's happening outside but of course for change something to happen we need really time and deep road to change. I met people around the world who do not travel by plain, because they think the carbon will be much bigger. And so obviously people make big difference, because they make our societies. But the culture still is the collection of so many individuals that makes sustainability society , so yeah we may put the mission, it start, but is doesn't necessary mean that , we have all the substructure to support that idea , but of course put it is starting point . At least, you know, it is there, you know first other people to think about those term put there then you can force them to think along those term, I mean it was a dream, I think it started during his time but I mean they were killing dogs, 5 6 years ago, if you as a residents call there is a dog, which is homeless dog, I mean it says they dealing with , they used to come in and kill them . So today we have so many academician that they are on to in these

projects. The project initiate between the university and for example, protecting the animals, we have the Key project now, we have some supporting financially, it is start, and it give you hope that things is change if you want to, so, now dogs can safety walk. they can survive in this environment.so .there is hopes the things can change that is also related to sustainability issues I think, change can come, people sometimes administration can make a big influence.

11. What do you feel is most important?

I think people are the most important. People make buildings, people make cities. So, people make politics, People make the difference. It was the first of course, I mean, when you think about it so, it's the base of everything, we build something for people, so we puts them in the center of our profession as well, so I think is that the most important values in life.

12. What types of conversations do you feel are necessary to have regarding sustainability and green building – both in the classroom and with faculty?

I think , instead of conversation, yeah , talking is very important, but when you talk and you don't do it, I think that something create controversies in between in student , so, yeah if you are saying that you have to put this bottle in to the recycling , I think you should do it yourself, yeah , and when people start to seeing and do it , so , I think sometimes doing and making is more stronger than just talking , so , yes , of course you can keep informing letting people know that also a big influence, because , most of the time things go around. because that is not a good interacting environment , if people don't know how to they contribute, so , of course, talking and letting people to know about issues related to sustainability and what is happening?, yes of course they contribute more and they are more part of that network.

13. Who needs to be around the table for these conversations? How do we get these people around the table within courses?

That's very difficult, today participant that is most difficult thing in the world, I find it anyway. But of course continuing is very important, if you continue, your efforts, in everything than change will come or the participation will come and then people will enjoy something. That's a real participant, that's a really learn, so I mean the education as the jobs are finding interesting ways of approaching students, so, they can it is not only students, it's a public as well. I mean our job is also to inform public our changes to get them involve so to let them know what is happening around the world. And this is how you can actually get people around the table. So , maybe , the better will come , but most of the time the pollution , yes, now our elected president is an architect , most of the time elected kind of pollutions are not from the same profession we are , so pollutions also have a big impact on the people on the media, so , from the first kind of hand informing that more try to get involved with them ,it's probably the best way you can influence people relating to sustainability.

14. When do we introduce interdisciplinary themes? How much do we introduce?

We have to just look at master thesis and PhD thesis being produced last couple of years , I mean we are not more talking about building form, space of organization , the form of organization, but there is so many other issues that are coming in to our field now so , can you put the stop to this? No, I don't think, you can, so, my students of course when they come, they want to do PhD or master thesis, major field of study I mean they sound like, they don't study architecture. It's like something else.so. This tells you the area more difficulty to put the keywords, for the major field of study. That means our field actually are going to more interdisciplinary things .I

think there is no way you can stop this, is it bad? I don't think it is bad. It's actually telling us the profession, the transformation is changing and I think we need to and there is more necessary come together to coming disciplines that has ever been, so our real world, has change a lot, and we have to adopt to this as soon as possible.

15. What do you personally feel are the biggest barriers to sustainability being a constant theme in architectural education?

Well, I think the biggest barriers are obviously the society living the environment around you that been created over the years, I mean it easier in Europe .when you go there, you can see most cars are high rip cars or electric cars, or they use public transportations and they leading invest on society on educational children, they really, so, it's easier actually to create change in the environment which already hasn't lost its keys from the past. Example: I really amazed when I'm going to Europe, in Uk, yes, cities having transfer traumatically everywhere, but rural areas it clearly amazing how much they retain their cultural identity, they really careful this, and it doesn't mean that they are not open to changes, technologies is welcome, but in the nice way and I think this is the greatest mistake that we have done. We have lost, and we have giving ourselves the chance to change. but , I mean the change should come in own barriers and limitation , so I think , basically architectural education is other source of education the biggest barriers of course in the society environment is very difficult to close change in this environment . Probably in another environment this already going in line with sustainability if use anyway, if you have lost your touch with the past. You have your tradition or.... I mean, that is got carrying the sustainability itself, but otherwise I mean changing the society in there, transforming is very difficult.

16. How do you feel that sustainability is incorporated into the NAAB Accreditation requirements?

Well, I mean, obviously, the administrate of the accreditation process, I don't think they says about sustainable. Why? Because, they have to monitor our education system, our administrative system in one way but what they demanding , this actually I don't mind its very sustainable itself, and this monitoring process that last for a few years, but previously, sending people here, probably on the more , maybe temporal base along certain times, would be more challenging and realistic , I mean and maybe it's not the sustainable for that but , because, they are demand are quite big , I know the last time , there was , the team for NAAB accreditation and we have to create these files, and they came to look at these files and they said it is a massive use of papers . Yes, it is our caving but there can be other ways our caving. I founded it very interesting that's although you say it's now how you can be architect, sometime in the thinking , it is not that bad , I mean , maybe they can come during the , I am usually get keep my files in lazy format, but we change to another format , again copy , doing all this stuff , so, we are doing strong structure , I don't find any sustainable, but of course they do put it again sustainability issues , and make sure in our curriculum actually we do care for sustainability issue

Appendix B: Instructors' CV who Attended in Interviews

1. Prof.Dr.Yonca Hurol

Date of Birth: 1960, Ankara
Nationality: Turkish Cypriot
Telephone: +90 392 6301559 (office)
+90 533 864 4905 (mobile)
e-mail: yonca.al@emu.edu.tr

EDUCATION:

Degree	Field of study	University	Year
B.A	Architecture	Middle East Technical University (METU)	**1978-1984**
M. Arch	Building Science in Architecture	Middle East Technical University (METU)	**1984-1987**
Ph. D	Building Science in Architecture	Gazi University	**1987-1992**

THESIS SUBJECTS:

Masters thesis: Some Aspects of Behavior of Framed Tube Skyscraper Structures,

Ph.D. thesis: Architectural Form Possibilities of High-rise and Slender Buildings
Jury members: Prof.Dr.Mustafa Pultar, Prof.Dr.Ergin Atımtay,
Prof.Dr.Azzem Aydınöz, Assoc.Prof.Dr.Esen Onat,
Assoc.Prof.Dr.Ziya Utkutuğ (supervisor)

RESEARCH INTERESTS:
Structural problems in design; tectonics of structures
Earthquakes in relation to architecture
Ethics and building technology

2. **Assoc.Prof.Dr S. Müjdem Vural**

Personal Details:
Name – Surname : Sadiye Müjdem Vural
Date and Place of Birth : 05.03.1972 – Istanbul
Nationality : Turkish
Marital Status : Single
Correspondence Address : Eastern Mediterranean University
Faculty of Architecture, Department of Architecture
Gazimağusa, KKTC
Telephone : 2039 (office extantion)
E-mail :smujdem@gmail.com,vural@yildiz.edu.tr, mujdem.vural@emu.edu.tr
Educational Background:

Degree	Field of study	University	Year
B.A	Architecture	Yildiz Technical University	**1995**
M. Arch	Architecture	Yildiz Technical University	**1997**
Ph. D	Architecture	Yildiz Technical University	**2004**

Languages:
Turkish (mother tongue), English (fluent), German (basic)
Qualifications:
2012 - Associate Professor / Yildiz Technical University, Faculty of Architecture
2012 - Visiting Scholar / Eastern Mediterranean University, Faculty of Architecture
2006 - 2012 Assistant Professor / Yildiz Technical University, Faculty of Architecture
2005 Visiting Scholar / University of Virginia, Faculty of Architecture
2006 - 2004 Research Assistant holding PhD / Yildiz Technical University, Faculty of
Architecture
1996 – 2004 Research Assistant / Yildiz Technical University, Faculty of Architecture
Research Areas :
Building Biology, Indoor Air Quality, Risk Management, Building Elements, Architectural
Details, Architectural Education

3. Asst.Prof.Dr Pınar Uluçay

1. Name Surname : Pınar Uluçay

2. Date of Birth : April 6, 1970

3. Title : Asst. Prof. Dr.

4. Education :

Degree	Field of study	University	Year
B.A	Architecture	University of Strathclyde	1988-1993
M. Arch	Architecture	Eastern Mediterranean University	2000-2002
Ph. D	Architecture	Eastern Mediterranean University	2002-2013

5. Academic Positions:

Position Title	University	Year
Research Asstistant	Eastern Mediterranean University	2000 - 2007
Part-time Instructor	Eastern Mediterranean University	2007 - 2010
Full-time Instructor	Cyprus International University	2010 - 2013
Full-time Instructor	Eastern Mediterranean University	3-

4. **Assist Prof. Dr. Badiossadat Hassanpour**

Born: October 18th, 1983, Iran
Marital Status: Married
H/P: +90533 8727361
Email: badieh.hassanpour@gmail.com / badiossadat.hassan@emu.edu.tr
Department of Architecture, Faculty of Architecture, Eastern Mediterranean University (EMU) Famagusta, North Cyprus, via Mersin 10, Turkey

Education :

Degree	Field of study	University	Year
B.A	Architecture	Islamic Azad University Tehran Central Branch	2005
M. Arch	Architecture	Islamic Azad University Tehran Central Branch	2009
Ph. D	Architecture	National University of Malaysia (UKM)	2012

Teaching Experience

• Sep 2013- Present Assist. prof. Dr, *Eastern Mediterranean University, Northern Cyprus.*

• 2013- June 2013 Assistant professor, *Tabari Institute of Higher Education, Iran.*

• 2013–June 2013 Invited assistant professor, *Pardisan institute of Higher education, Iran.*

• 2010-2012 Teacher Assistant,*Universiti Kebangsaan Malaysia,Bangi.*

• 2006-2009 Lecturer, *Pardisan institute of Higher education ,Mazandaran, Iran.*

• 2006-2009 Lecturer *Mazandaran institute of Technology, Mazandaran, Iran.*

• 2006-2009 Lecturer, *Tabari institute of Higher education , Mazandaran, Iran.*

• *2005-2007* Lecturer, *Islamic Azad University (SAMA Branch), Mazandaran, Iran*

Appendix C: Student Questionnaire

Would you please fill this Questioner to be used in as material in my master thesis at Eastern Mediterranean University.

Please write your design course code: ….

Nationality: ….

1. To what extends do the studio location affect your sustainability understandings?

	Min Max				
	1	2	3	4	5
S classes **(near to hidden cafe)**					
Color building **studios**					
Banda bulya **(old town)**					

2. How much the previous studied **must courses (architectural courses)** have influenced in your understanding of sustainability?

Min Max				
1	2	3	4	5

3. How much the previous studied **must courses (tectonic courses/engineering courses)** have influences in your understanding of sustainability?

1	**2**	**3**	**4**	**5**

4. How much the previous studied Faculty **elective courses** have influences in your understanding of sustainability?

1	**2**	**3**	**4**	**5**

5. How much the previous **design studios** have influenced in your understanding of sustainability?

1	**2**	**3**	**4**	**5**

6. Which courses have a better understanding for sustainability in your academic's courses?

7. How much are you interested about sustainability and its related aspects?

1	**2**	**3**	**4**	**5**

8. How much did you pay attention to the cost or other sustainable items (environmental/ economic/ social) in your project?

1	2	3	4	5

9. How much do you feel sustainability currently involves in your theoretical courses?

1	2	3	4	5

10. How much you feel the sustainability is involved in teaching technique in the design studio?

1	2	3	4	5

11. How much do you feel the sustainability has been brought into your oral studios discussion?

1	2	3	4	5

12. How much do you discuss about your design proposal with any experts regarding all sustainability aspects?

1	2	3	4	5

13. To what extends do the following items give importance to your design proposal?

	Min Max				
	1	2	3	4	5
Environmentally sustainability					
Social sustainability					
Economic sustainability					

14. How much do you feel the sustainability is involved in evaluation of your design proposal in Interim submission?

1	2	3	4	5

15. How much do you feel the sustainability is involved in the jury discussion and evaluation of your final jury?

1	2	3	4	5

16. To what extends do the following items give importance to the guidance presented in design studio by teaching staff and assistances?

	Min Max				
	1	2	3	4	5
Environmentally sustainability					
Social sustainability					
Economic sustainability					

17. What type of activities can help us for improving sustainability in the architectural curriculum?

- Research project ☐
- Design studio project ☐
- Workshop ☐
- Competition ☐
- None of them ☐

18. Do you have any suggestion for improving this topic in architectural curriculum?